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Improved Elevated Atmospheric Railway.

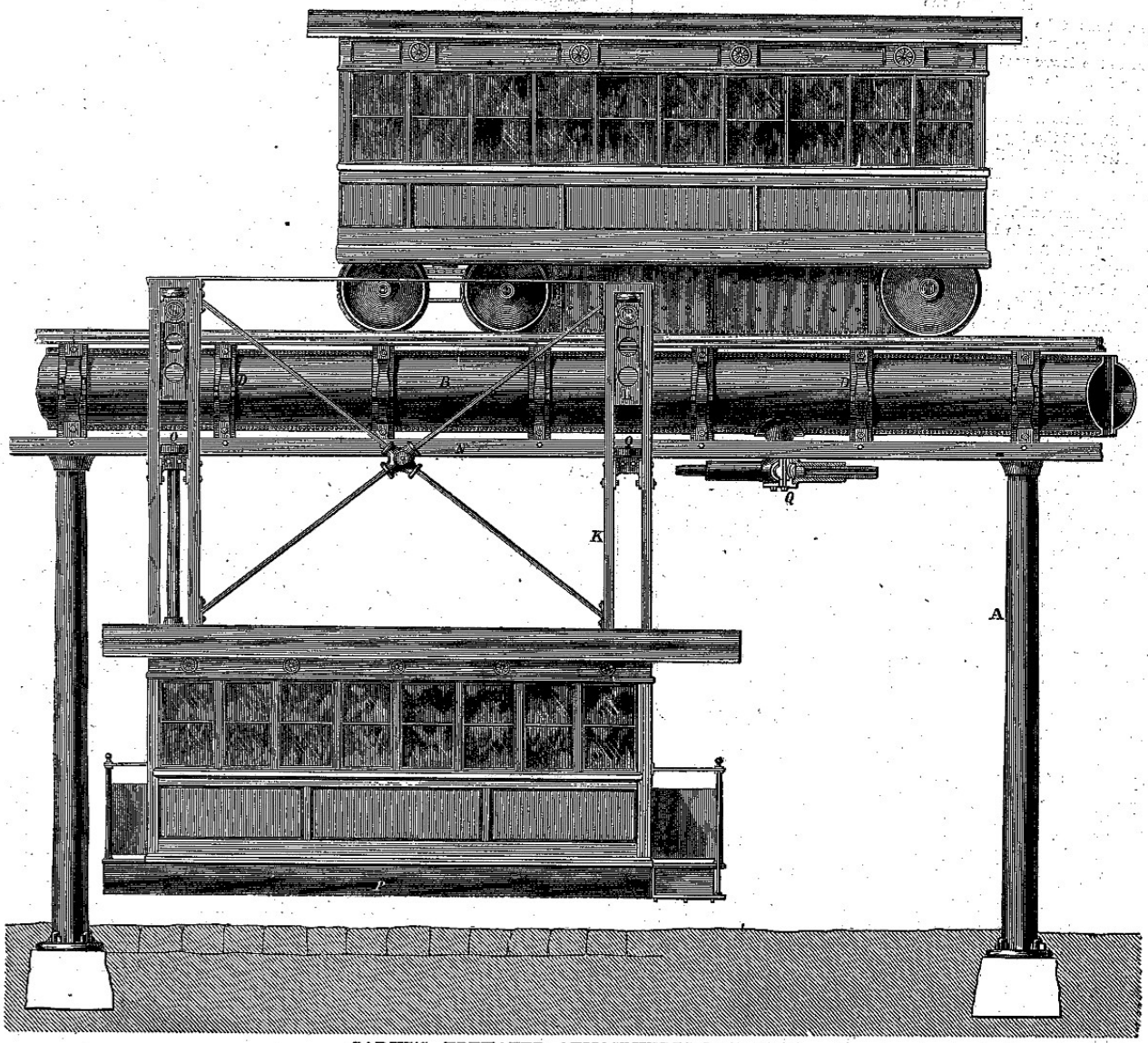
How shall we get in and out of this great city? As it extends its limits far into the adjoining country, business streets become yearly more difficult of access, and it is a matter for serious consideration to suggest some plan for improvement that shall be practicable and popular; for whatever degree of ingenuity and energy is applied to overcome natural obstacles, if the people conceive a dislike for it the enterprise will fail.

All who see the city cars daily know well that they are not only disgusting to those who possess the senses of sight and smell, but inadequate to the work demanded of them.

Underground railroads have been proposed, but unless they be well ventilated they will be extremely injurious to health. It has been proposed to run cars on elevated tracks, and many plans have been published for this purpose. Herewith we illustrate the latest, which is operated by compressed air.

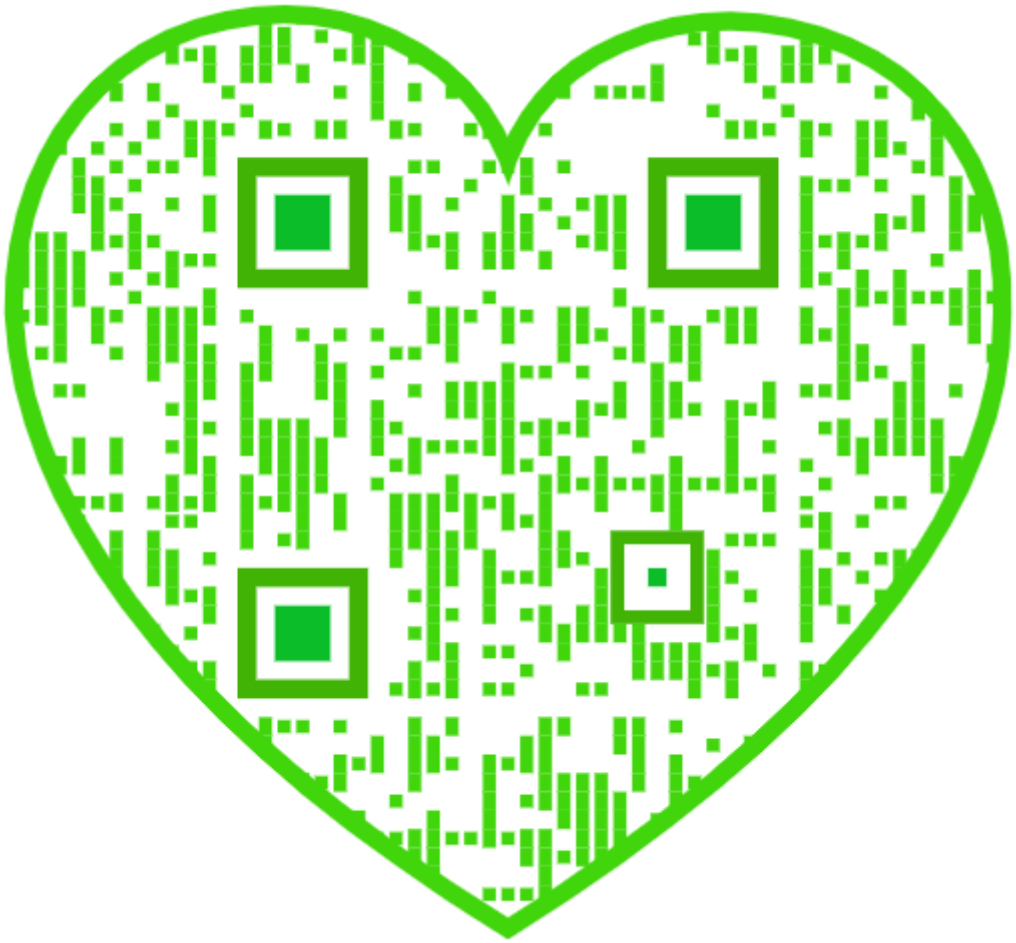
Compressed air has been used as a motive power on railroads, but a supply had to be taken into a tank at a station sufficient to drive the car or train to the next one. This involved the necessity of carrying an immense reservoir, which made it, so far as explosion is concerned, more dangerous than steam as ordinarily used.

In the annexed illustration it will be seen that the objection above mentioned is avoided. In this case the supply of compressed air is carried the entire length of the road; and the reservoir of the car may be filled as often as the car is stopped to set down or take up passengers, without delaying the car. By this arrangement neither a large quantity nor highly compressed air is required. It is designed that this railway be built entirely of iron except the stone blocks on which the iron columns stand and to which they are firmly bolted. Being entirely of iron, and out of reach of wear and tear by being driven upon by carts and carriages, it may be set down as indestructible.



CARYL'S ELEVATED ATMOSPHERIC RAILWAY.

Before describing its several parts, we will mention the advantages claimed by Mr. Caryl that this road possesses over street railroads as now in use:—It would not be obstructed by snow. Its two systems of roads, or four tracks, would occupy no more room in a street than is now occupied by a double-track road. While the lower or accommodation car would take up or set down passengers the same as street cars now do, the express on the upper tracks, not being liable to meet with obstructions, would be run



at high speed, stopping at regular stations. A road, ten miles long, having on its several tracks 300 cars, constantly moving for eighteen hours, would be supplied with its motive power for $300, while the same road would require 3,000 horses to perform the same duty, at a cost of at least $1,500. Cleanliness of the street incident upon the disuse of that number of animals; reduction of the wear and tear of pavements and lessening of the noise, etc. All these are of small value as compared with that of the increased comfort and facility which would be afforded to citizens.

The details are as follows:—The columns, A, are firmly secured to stone sleepers beneath the pavement, and to the tops of them is secured the wrought-iron tube, B, extending the entire length of the road, filled with compressed air by means of steam engines at the ends of the road. A vertical wrought-iron plate, C, extends internally from one column to the other, to strengthen the tube. This tube has cast-iron hoops, D, around it, firmly fastened to the lower part of it, the hoops having in them a mortise or step for the brace, E; the upper end enters a mortise in the vertical post, F, at the top of which is affixed the rail. To the bottom plate, I, the vertical posts are tied to the cast-iron hoops at both upper and lower ends, by iron rods, G and H, as shown in Fig. 2.

Figs. 1 and 2 represent a car suspended from the rails by means of iron bars, K, between which is an iron frame, L, that slides up and down. Through the frame pass axles on which the wheels, M, that carry the car, revolve. The plate, N, is clamped by the wheels, O—one on either side—the shafts being geared together and driven by engines in the forward end of the car. These are the driving wheels. Beneath the car is a tank, P, for holding compressed air. The main tube is filled with air by means of stationary steam engines at one or both ends. The tank beneath the car as supplied with compressed air from the main tube by means of horizontal pipes, R, attached to a revolving collar, Q, fitted to a casting on the main tube, and containing air passages. These pipes are provided with suitable valves to admit air to the tanks, and are fixed at proper distances along the line of the road, at points where the car stops to take up or set down passengers.

A section of the road, constructed as above, but disconnected from the main road, and supported by a single column, will be employed as a turntable; the column, being revolved half round, carries the track and car with it; each end of the road has such a turn-table, which is to be operated by the stationary engine that pumps air into the main tube. The upper tracks, S, are intended for cars moving at high speed and stopping only at regular stations. Each car will carry its own engine and air tank, which is supplied with compressed air in the same manner as the accommodation or suspended car. At stations stairs will be required to ascend to the level of the track, and bridges to pass to the cars. The fare being paid at the stairs, conductors will not be needed, and a large saving will be made in that item.

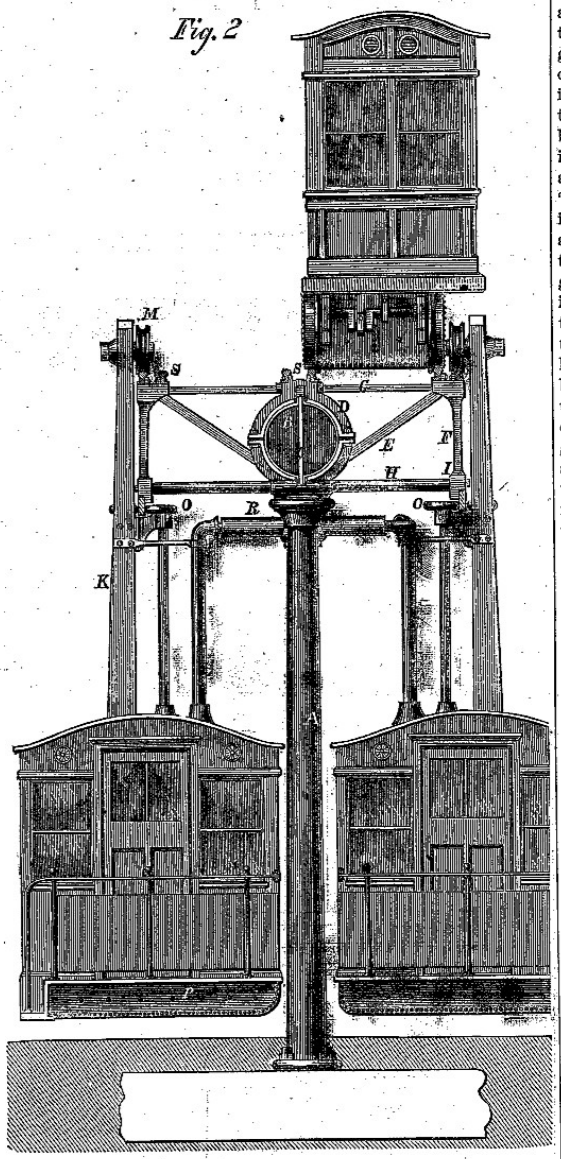
The inventor of this plan of atmospheric railway is A. H. Caryl, of Forgeville, Groton, Mass.

LUCK is ever waiting for something to turn up. Labor, with keen eyes and strong will, will turn up something.

A NEW NAVY.

An idea is spreading that we have no navy fit to cope with vessels throwing shot of from 460 lbs. to 1,000 lbs. weight, of which one vessel has just paid us a friendly visit. Eight years ago, we began the reconstruction of our navy, and there is now a prospect that we shall have to reconstruct it again. Never, we believe, were the Admiralty so much in need of the best engineering—as distinguished from nautical—advice as now. Although the defeat of Austrian power has not happened at sea, we have had a lesson, which none who can think for themselves can reject, as to the dangers of resting in fancied security while other nations are doing their best to surpass us in the efficiency of their instruments and engines of war. While we are wondering at the size of the Rodman 15-inch guns, the Americans are preparing to make ordnance to throw 25-inch shot of nearly a tun weight. We are standing still or retrograding, and have not a 13-inch gun we dare take into action. We have failed, with our very best service gun, to destroy even the *Royal Sovereign's* turret, and we know that other nations which have adopted the turret system are now making them of a strength very far indeed beyond that of the *Royal Sovereign's*. We may make what allowances we like for Yankee brag, but we are told that Mr. Fox, the Assistant Secretary of the United States Navy, was ready to let our whole fleet hammer at the *Miantonomoh* for two days, provided we would afterward allow that vessel to work ten hours' havoc upon our ships in return. Let another *Trent* affair arise, and we may have scores of monitors upon us.

Fig. 2



For our own part we are bound by no professional prejudices in this matter. We have, before now, criticised the turret ships adversely, but we could only go by such evidence as we had before us. Capt. Powell's experiments upon the Coles shield of 1861 had not been published in detail, nor had the *Royal Sovereign* been under fire, nor had the *Monadnock* doubled Cape Horn, or the *Miantonomoh* crossed the Atlantic. And we have not even yet data from which we can draw conclusions with certainty as to the effect of any other guns or the resistance of any other armor than that we have tried. We have been told that cast-iron shot break up and lose half their energy on striking armor; but we have the testimony of the Americans that they have fired 400-lbs. spherical cast-iron shot, with 60 lbs. of powder, right through a target formed of a large 6-inch plate, made by Messrs. Petin, Gaudet & Co., and backed with 30 inches of oak. The shot was 15-inches in diameter, and had an initial velocity of 1,480 feet per second. "A target, composed of six 1-inch plates, backed by iron beams 10 inches by 10 inches, was torn in two and thrown down by similar projectiles. Laminated targets, composed of 1-inch plates up to 13 inches aggregate thickness, and backed by 24 inches to 30 inches of oak, have been ruptured and shattered through and through, though not completely penetrated, by the same shot and charges." If we believe these results to be correctly reported, it would be a fatal venture to expose our ships, except, possibly, those most heavily armored by Mr. Reed, to the fire of such ordnance. And the Americans have 20-inch guns, throwing shot of more than double the weight, and which, they repeat to us, will bear 100-lb. charges, while even 120 lbs. to 140 lbs. is said to be within their strength. And not satisfied with these, they have still heavier ordnance in progress. Such shot would, we fear, smash through all our ordinary armor-plating, and the heavier shot would no doubt penetrate any thing we have to set up against them.

Upon these points, we admit, we are greatly in want of further information, but it is time that we set to work in earnest to test the destructive powers of large smooth-bore guns, firing cast or wrought-iron spherical shot. In our attempt to employ large rifled guns, firing elongated projectiles at high velocities, where, in the short-range actions of naval warfare, round shot would be exactly as good if not better, we are working to pressures of powder-gas which no iron can bear. We have been seeking to fire 600-lb. shot with a base for pressure of but 139 square inches, whereas the Americans give 176 square inches for a 400-lb. shot, the consequent pressures per square inch necessary for a given initial velocity being nearly as two in our guns to one in theirs. Now, indeed, the 13·3 inch bore of the 600-lb. gun is to be diminished to 12 inches, and the area for the powder pressure thereby reduced from 139 to 113 square inches. In the new American 25-inch guns, firing, say, 2,100-lb. shot, the pressure per square inch, requisite to generate a given initial velocity, will be less than in our so-called 600-pounder, the weights and areas of shot being respectively, for the American 2,100 lbs. and 490 square inches, and for the 13·3-inch gun, 600 lbs. and 139 square inches. Let our ordnance authorities at once instruct Mr. Fraser to make two or three 20-inch or 25-inch guns to fire round shot, and let the result be known. We are already far behind the Americans in the power and endurance of heavy ordnance, and they have plainly told us that their policy is to always maintain an advantage over us in this respect, if possible.

As for our ships, we fear we shall have to begin again. We can have and must have ships safe against even the 25-inch gun, but we believe that, setting preconceived notions aside, these must of necessity be turret ships. We can plate them for seven feet under water, and four feet above, with even 18 inches solid plates, if these can be rolled, and it is time we should try. We can as easily carry 18-inch plates on a 5-foot backing over a hight of 11 feet, as plates and backing of half the thickness over twice the hight. We are still at the beginning of the art of building invulnerable ships of war.—*Engineering*.

The First Boring for Oil in Pennsylvania.

The Titusville (Pa.) *Herald* has an interesting article on Col. E. L. Drake's first attempt to bore for oil, which was the precursor of a vast business that, in 1864 and '65, yielded a larger revenue than that derived from coal and iron. Col. Drake went to Titusville in 1857, at which time it contained a population of about 125, two hotels, no church, and only two stores. The petroleum was then collected from the surface of springs on Watson's Flats by means of blankets, and bottled for medicinal uses. He conceived the idea that there was a basin or reservoir of oil below the surface, and determined to test it by boring. Having induced some men of capital to assist him, he entered upon his experiments in the spring of 1858.

His first step was to visit the salt wells on the Alleghany and observe the *modus operandi*. Finally, he selected a spot near Ames's Mill, below Watson's Flats, but was delayed till the spring of '59, before he had secured a competent driller and the necessary tools. His supposition was that he would have to sink his well to the depth of 1,000 feet. The same kind of tools were used then as now. The driller charged one dollar and a-half per foot for boring. The enterprise was the subject of a good deal of ridicule in these parts, and many persons made themselves merry at the expense of the pioneer. An instance will prove this. Mr. D. made several contracts with a number of practical drillers, which were successively broken. He at last ascertained that the cause of it was, that his scheme for boring for oil was looked upon as entirely visionary, and that he was regarded as a monomaniac on the subject. He finally resorted to an innocent deception to secure an operator, giving out that he intended to bore for a salt well. A series of annoyances and delays, as we before remarked, intervened to prevent operations till the month of June, '59.

Mr. Drake's assistant proposed to crib to the rock, which was the invariable practice in those days. Mr. Drake advocated the driving an iron tube to the rock —an idea which the miner scouted, but having failed to crib, owing to the water, the tubing was tried and proved a success. This was an entirely new feature then, but is now the universal practice. Indeed, it is now applied to putting down fresh-water wells. Had Mr. D. procured a patent, to which he was justly entitled, for the invention, he would have realized a fortune from it.

The pipe was driven thirty-two feet to the rock, and then the well bored thirty-seven feet and six inches in the first sand rock. Not having any pipe, Mr. D. commenced pumping before he had tubed the well, using a common iron water pump for the purpose, fastening the handle of the pump to the walking beam. Satisfied by this process of the presence of oil in considerable quantities in this well, he then went to Erie and Cleveland for tubing, could obtain none there, nor at Buffalo, and finally ordered it from Philadelphia. After tubing the well it turned out a complete success, pumping twenty-five barrels a day, and continuing, when in operation, to yield about this quantity for about two years.

Mr. D. was then in the position of the man who drew the elephant at the raffle, and did not know what to do with it after he got it, oil being comparatively good for nothing. Then there was no home or foreign demand for it, no refineries in existence, and its illuminating and lubricating properties were not then discovered. The parties engaged in the manufacture of coal oil were slow to acknowledge or discover that petroleum possessed equal illuminating qualities. The first refiners who commenced refining petroleum were James McKeown and Samuel Kier, of Pittsburgh.

From this period it came rapidly into commercial use, stimulated development, and rose in value in a corresponding degree. Few can appreciate the delays and difficulties incident to this discovery. It was necessary to go to Erie, and more frequently to Pittsburgh, for everything in the way of machinery. The few stores here were only supplied with tools for lumbering and farming purposes. On one occasion, Mr. D. wanted a pick, two shovels, a chain and some spikes. There were only two stores in Titusville at the time, but their assortment did not contain the articles needed. Mr. D. went to Hydetown, and bought his pick of Charles Hyde (now an oil millionaire), who kept a country store in a tumble-down log cabin in that place; bought his spikes of Samuel Q. Brown (another oil millionaire), at his store in Pleasantville; procured his chain of David Mitchel (another oil millionaire), at his store in Enterprise; but was obliged to send to Erie, a distance of fifty miles for two shovels. Mr. D. engaged in putting down other wells, but failing health compelled him to abandon his undertakings here and return East, before the era of speculation set in, and before petroleum had produced such a revolution in the commercial world, and become the most fruitful source of individual and national wealth that has ever been discovered.

Sweet Corn all the Year Round.

Nearly all the dried corn that one buys has a flavor, when boiled, resembling soda or pearlash—certainly it has but little sweetness and much toughness. Now, there is a way of preserving corn which entirely avoids these results, and which is warranted to give "entire satisfaction."

Select, in their season, fresh, medium-sized ears of corn, strip off silk and husks, then plunge the ears in boiling hot water, leaving them in for only three minutes. Next cut the corn kernels from the cob with a sharp knife and spread them out on flat dishes, taking care not to have the layer more than two kernels thick.

The dishes must then be placed either in a moderate oven (left open) or over the kitchen range on a board shelf which can be arranged over it for the purpose (say 2½ or 3 feet above the top of the range). The contents of each dish must be disturbed occasionally, so as to insure their becoming thoroughly dried. It is well to spread lace or mosquito netting over the dishes to protect them from flies, dust, etc., for sometimes the corn will be two or three days in drying.

When the corn is perfectly dry, tie it up in bags and put it away in a cool, dry place.

In winter, when you wish to enjoy the fruit of this little painstaking, you take out a few handfuls of the corn, wash it well soak it all night, and the next day boil it till tender, in the same water it was soaked in. About twenty minutes before you take it from the fire, add milk to the liquid in proportion to your taste, and when nearly done, add butter, pepper, and salt. A little corn-starch, added as thickening, ten or fifteen minutes before taking the corn from the fire, improves it very much. The corn should not be dry when served, but floating thickly in its own stiff broth, and, my word for it, it will taste as fresh and sweet as any corn fresh grown.

I need not say, that by soaking corn thus dried all night, and also soaking the preserved beans for the same length of time, a delicious winter succotash can be made the next day, as good as any ever eaten in summer.—*Working Farmer.*

Profits on Sleeping Cars.

A correspondent of the Cleveland *Leader* thus adverts to the sleeping-car monopoly:—

"Many of your readers know that Woodruff, Knight, Myers and others, consolidated their patents some years since, and organized the Central Transportation Company, whose cars are found on the Pittsburgh, Fort Wayne and Chicago, Pennsylvania Central, Northern Central, New York and Washington, and other much traveled routes.

"But it is not generally known that their enterprising company have been quietly buying up every patent that could be bought, until now they are able to control the entire sleeping-car interest in the country. A wealthy corporation in Southern Ohio got its master mechanic at work to build a couple of coaches, with instructions to put in nothing that would be claimed by this overshadowing company. He employed experts, and after a thorough ascertainment of all the facts in the case, as he supposed, completed his work. The directors were gratified, and the cars had been on the road perhaps a week, when the Superintendent was waited upon by a very gentlemanly person who introduced himself as an agent of the Central Transportation Company. He was received with courtesy and invited to a seat. After the necessary discussion of the weather and the crops, the polite visitor intimated that he was authorized to contract for the purchase of the new sleeping coaches.

"The Superintendent grew a bit reticent, and responded somewhat curtly that the Company which he had the honor to represent was under no necessity of parting with any of its rolling stock, having a comfortable balance in the bank.

"Whereupon the gentlemanly agent proceeded to intimate, in the most delicate manner, that other contingencies than a reduced bank balance sometimes operated to make transfers of property profitable to the seller.

"This brought the Superintendent to the issue without further skirmishing, and he bluntly informed the gentlemanly agent that the cars belonged exclusively to the railway company, had been built without infringing anybody's patent, and would be run without asking anybody's leave.

"Whereupon the gentlemanly agent smiled coldly, bit his lower lip slightly, and responded frankly: 'Perhaps your Company had better sell its cars while there is a market. We will pay you what they cost and run them for you; but you can neither own them nor run them another day, sir!'

"The Superintendent grew tractable, and in fifteen minutes was satisfied from documents exhibited that it was well to sell 'while there was a market.'

"Suit has even been commenced in the United States Courts against Mr. Pullman, the party who, a few weeks since, gave so grand an excursion to celebrate the completion of nine elegant coaches built for the Michigan Central, Burlington and Quincy, and Northwestern Railways, costing from $15,000 to $21,000 each.

"The public have occasion to regret this combination for one good reason, if for none other; and that reason arises out of the fact that the Central Transportation Company seem to buy the best patents for the sole purpose of suppressing them.

"The railway companies, as we have already seen, have for once found a greater than themselves, and are as helpless as children in the hands of the 'sleepers.' They must have 'sleeping cars on all night trains,' or they might almost as well not run night trains. The patentees control the cars and dictate the terms upon which cars can be had, which are these: The patentees will supply the cars, and keep the upholstery and bedding in repair and in order for use. The railway company shall furnish the motive power and keep the car in repair.' And the agent of the patentee shall collect such fees for the use of berths as the owner of the car may decree.

"The railway company is thus saved the cost of an ordinary car, which the passengers would require, and the Central Transportation Company, or whoever else may own the sleeping car, makes money at a somewhat comfortable rate.

"Take, for example, the route of the Pennsylvania Central:—

Prime cost of a car	$5,000
Annual salary of a conductor	600
Annual salary of porter	300
Washing	1,500
Incidentals	500
Total	$7,900

"An average of rentals would be, in six sections and three state rooms per night, for 300 nights in the year:

Six sections at $3	$18 00
Four state rooms at $3	12 00
Total	$30 00

"Three hundred nights, at $30, make $9,000. "Deduct running expenses, $2,900, and the dividend is $6,100, upon a capital of $5,000, or more than one hundred and twenty per cent. On some routes, however, the profits are much greater, amounting in some instances to over 300 per cent per annum."

A USEFUL CHART.—Mr. Charles Kinkel, of this city, has published a diagram for ascertaining the width of belts to drive any given machine. This diagram is accurately drawn and is accompanied by an explanation of its use. From it any one can tell by simple arithmetic what size of belt he requires to do his work.

American Cast Steel.

The manufacture of American cast steel has, within the last five or six years, assumed a rank and importance among the great manufacturing industries of our country, that its just claims to be considered as an element of national wealth cannot be reasonably ignored, and it should therefore receive its full share of the fostering care of the Government for its support.

That we possess all the appliances, and the ability to produce in this country steel of every description, from the lowest grade to the very finest quality imported, made exclusively from American stock, is now an established fact; demonstrated beyond the possibility of dispute, upon testimony from which there can be no appeal, and which we are prepared to furnish in overwhelming variety and quantity.

Among the severest tests of the comparative quality of English and American cast steel, it may be stated, that the celebrated fifteen and twenty-inch guns manufactured by Messrs. Knap & Co., at the Fort Pitt Works, are all bored and turned with tools made exclusively from American cast steel. These gentlemen inform us that its strength is so much greater, that much heavier cuts are taken upon large ordnance than any English steel will stand. The sabers which have been furnished to our armies by the great establishment of C. Roby & Co., West Chelmsford, and of the Ames Manufacturing Co., at Chicopee Falls, Mass., and others, are likewise made of Pittsburgh steel, in preference to all imported steel.

American cast steel is extensively used in our public and private armories, for the manufacture of bayonets, pistols, carbines, etc. In short, there is no use to which steel can be applied, in which it does not compete successfully as to the quality of the best imported brands.—*Report of Revenue Commission.*

Cutting Garments by Machinery.

There is in operation, at the establishment of Bernheimer & Newman, No. 87 Chambers street, a machine for cutting all kinds of woven fabrics into garments. The machine consists of an endless cutter revolving on two wheels placed above a table, and a large fly-wheel placed below, worked by hand, and by which it is set in motion. The pattern to be cut out is drawn on the top garment, all being placed in a clamp to keep them in position, and are pressed against the cutter and moved according to the desired pattern.

The number of garments cut out at one time is regulated by the hight of the two wheels from the table. The cutter is sharpened by setting the machine in motion and placing a grindstone turned by hand in continguity to it. This machine is extremely simple, being at the same time very effective.

Smelting of Lake Superior Copper Ore.

The ore of the Lake Superior copper mines is called "copper rock," and consists of pure copper, with stone, earth, and other adventitious substances, mechanically united. It is usually broken either by hand, or stone crushers driven by hand, to fragments about four or five inches in diameter. Then it is passed through the stamping mill and pulverized to fine sand. A current of water directed through the powdered mass washes out the extraneous matter, which is specifically only one-third as heavy as the metal. This "dressed mineral" contains from sixty-five to ninety per cent of copper, and is smelted in a reverberatory furnace, with lime or other suitable flux. The lighter minerals rise to the top and the copper sinks to the bottom, whence it is drawn and cast into ingots or pigs.

Obtaining Soda from Common Salt.

Mr. Weldon of England has taken out a patent for a process for the above purpose, as follows:—

The new process consists in placing within a vessel capable of resisting the required pressure an equivalent of common salt, and another of carbonate of magnesia, with a small quantity of water, and then pumping into the vessel the carbonic acid formed by causing atmospheric air to traverse coal in a state of ignition. The carbonate thus becomes bicarbonate of magnesia, which dissolves in the water, and then decomposes the chloride of sodium, chloride of magnesium, which remains in solution, and bicarbonate of soda, which precipitates, being formed. The whole process lasts but a quarter of an hour at most, and the cost is only that of the coal used in forming the carbonic acid. A moderate heat drives off the second atom of carbonic acid from the bicarbonate of soda, changing it into carbonate; and the magnesia may be recovered from the chloride by evaporating the solution containing it to dryness, and raising the residue to a temperature below redness.

Necrosis Produced by Tobacco.

A case has recently occurred to Mr. Paget (*Lancet*) in which death of a portion of the bone of the lower jaw was occasioned by the introduction of the oil of tobacco into the cavity of a carious tooth, for the purpose of curing the toothache. The patient was an Italian sailor who used the oil from the stem of his pipe. Mr. Paget, in remarking upon the case after having removed several sequestra, said:—"The case well illustrates a source of danger which is not generally recognized. The practice of smoking is very widespread, and foul pipes and carious teeth are very common. Every smoker of a pipe has been disgusted now and then by sucking into his mouth a few drops of the highly pungent and nauseous product of the combustion of tobacco. In the action of smoking the tip of the tongue ordinarily receives this deleterious fluid, and is very much blistered in consequence. Were it not for the tongue one can readily imagine that hollow teeth would often receive this fluid; with what amount of risk the case before us well shows. It is well known that, for phosphorus to excite the inflammatory action which so often affects the lucifer-match workers, the fumes must be applied to a raw vascular surface in immediate connection with the nutrition of bone. This almost always happens through the medium of a carious tooth. There is no reason to suppose that tobacco oil would set up inflammation except under similar circumstances. It is, however, very probable that some cases of acute necrosis of the lower jaw of obscure origin may have really originated from the accidental poisoning of the tooth-pulp by this liquid, and the possibility of this source of disease should be borne in mind.—*Medical Record.*

A Disinfecting Filter.

It is known to physiologists that the most suddenly fatal of all poisons are those of organic origin. The presence of this matter in water is frequently imperceptible to taste and sight. In the year 1854, a pump from which large supplies of water were drawn, yielded perfectly clear water, which yet killed 500 people in the first three nights of September. Stimulated by this experience, researches were entered upon to ascertain whether all the organic matter in water could be filtered out. More recently a curious property of magnetic oxide of iron has been demonstrated in the preparation of filters. This magnetic carbide is asserted to possess the power of converting oxygen into ozone. The inventor says its purifying property is "due to its power of attracting oxygen to its surface," which there becomes changed into ozone, or at least a body having its properties. But whatever may be the theory of its action, its effects in removing oxidizable and other organic matter from water are undoubted.

[We find the above in one of our exchanges. There is no doubt that impure water is a prolific source of disease, and that it would be much better to filter much of the water now used, especially that which is liable to receive vegetable matter from surface drainage. But we do not quite understand the theory of this inventor, who proposes to attract oxygen to the surface of water. The explanation is mixed with some mud.—EDS.

Foreign Cotton.

The report of the Cotton Supply Association, presented at Manchester, England, on the 29th ult., presents some interesting facts relative to this subject. Failing to receive from America the usual supply of cotton after the war, efforts were made to grow cotton elsewhere, and in answer to numerous applications American seed was forwarded to many places, no less than 230 tuns being sent to the Ottoman Empire. The quality and quantity of cotton grown in Turkey induced the supposition that the supply would be very valuable. The efforts of the committee in India made them believe that they would not be disappointed.

Favorable accounts were received from Italy and Brazil, and large numbers of gins and plows had been forwarded in order to better prepare the cotton for market. The chairman stated that owing to the use of better implements and the introduction of larger capital, their prospects in India were better now than at any previous time. He considered that the renewal of cotton planting in America was an important item in estimating the supply, but the duties imposed in the United States left an opening for successful competition from the rest of the world.

Pine's Toning Process.

A correspondent of *Humphrey's Journal* has the following:—

Having had numerous inquiries referring to the bright and clear tone of my prints, and as many suppose I use a peculiar toning bath, I send you herewith the secret of their brightness, which is owing to the prints being thoroughly freed from the nitrate of silver before toning. To accomplish this object, I have recourse to the following method:—

I take the prints just as they come from the printing frames, and immerse them in a solution composed of water, one pailful, common salt, one ounce. The prints are immediately covered with a white powder (chloride of silver), which gives them a foggy appearance. I then lay them, one at a time, on a glass, face upward, and remove the powder by means of canton flannel, wrapped round a wooden roller, a little longer than the width of the print. By passing this roller over the print once, with moderate pressure, the chloride of silver is entirely removed, and the print looks bright and clean. The print is then placed in a dish of clean water, and the operation is continued until all the prints are in the second dish, from which they are placed in the toning bath. I can wash thoroughly five hundred 6¼ by 8½ prints in an hour without difficulty.

The advantages of this plan of washing are—

1. Three-quarters of the silver used in printing can be saved, as all of it that is washed off remains in the first dish.

2. The prints are washed thoroughly, which cannot be done by placing them in running water.

3. The prints can be toned with one-third less gold than was formerly used.

4. The prints, being clean, tone quickly, and do not change color in the fixing bath.

5. The fixing is accomplished in less time, and is more thorough, than when the prints are imperfectly washed.

6. Great economy of water: six pailfuls being ample in which to wash five hundred 6¼ by 8½ prints.

8. Mealiness in the prints is entirely avoided.

I use an 80-grain silver bath, and float the paper one minute in summer, and two minutes in winter, and tone with a simple solution of chloride of gold and water, neutralized with chalk. I fix the prints in a bath composed of water, 16 ounces, hypo. soda, 4 ounces. If the hypo. soda be acid, I neutralize the solution with carb. soda. Some may suppose the surface of the paper is injured by rubbing it with the flannel, but such is not the case.

A Unique Specimen.

Mons. Valiant, a gentleman who has collected a very fine cabinet of minerals on this coast, a few days since exhibited to us the most unique specimen we ever saw, though we have spent many weeks examining the cabinets of minerals at Paris, London, and Washington. It consists of a mass of calc spar, a crystallized variety of carbonate of lime, about six inches long, by three wide, and two thick, in which are dark layers of malachite, or carbonate of copper, while all over its surface, are masses of native copper, gold and silver in crystals. The gold by assay is found to contain a slight alloy of silver. The silver is very rich in gold, while the copper is absolutely pure. There is not a particle of quartz in the specimen, which altogether is invaluable as a mineral curiosity. If any person in California knows where such specimens may be found, they are more valuable than the same weight in gold. Mons. Valiant has refused $150 for that to which we refer. —*San Francisco Miner.*

Correspondence

Heating of Guns in Firing.

MESSRS. EDITORS:—On page 16, current volume of the SCIENTIFIC AMERICAN, is an article entitled "Why a Gun Becomes Hot on Firing," in which the writer expresses his opinion that the greatest quantity of heat in a gun is not so much the result of the combustion of the charge as that of its percussion, which is supposed to affect the molecules of the iron in the same manner as a blow of a heavy hammer would do. Now, notwithstanding my deference for your learned correspondent, I beg leave to give him one or two of my reasons for not being of his opinion.

About a year ago I made several experiments in gunnery, to compare an explosive compound I had discovered in my chemical experiments. This compound was made of chlorate of potash, 50 parts; prussiate of potash, 23 parts; white sugar, 30 parts; red lead, 5 parts. Its power, compared with ordinary gunpowder, is enormous; its action very sudden. To ascertain its heating property against that of ordinary Hazard powder, I attached on the breech of a heavy rifle one end of a double blade of steel and brass riveted together, and caused the other end to slide—when influenced by a difference of temperature—upon a graduated arc; and all was surrounded by a wooden case, blackened inside and white outside. I fired as rapidly as I could ten rounds of accurately-weighed charges of Hazard powder, and noticed the temperature of the rifle as well as that of the atmosphere. Then I fired charges of my compound, under the same circumstances, and, although every explosion was a great deal more instant—which I had ascertained by its destructive effect upon other heavy rifles—I had fired thirty-seven rounds when the thermometric blade reached the reading of the Hazard powder of ten rounds.

I will offer this other reflection. When a piece of iron is struck with a hammer, the molecules of the iron are disturbed and are made to occupy less space, and that change is permanent, and the heat is known to be then only latent heat, not mechanical. Although I have ample proof that a gun expands enormously at the instant it is discharged, still its expansion is not permanent, and I cannot believe that it gives out a single unit of its latent heat.

Again, I have found that the powder that burns the slowest is the one that heats the gun most; and if the greater quantity of the heat of a gun comes from percussion, then an ounce of the fulminate of silver discharged in a gun sufficiently strong, would instantly make it red hot, or even melt it. Now, to my certain knowledge, it does not heat the gun so much as coarse powder.

The heating of a gun is not sudden, but greater after the explosion; that resulting from percussion is instant, and is less after the blow.

FRANÇOIS SULIRE.

Watertown, N. Y.

Measuring and Regulating Temperature.

MESSRS. EDITORS:—Will one of you assist an old subscriber to the following information:—For the last six months I have been making experiments, and to facilitate my progress I desire to obtain a regulator of temperature. I find it necessary to maintain a uniform heat of 110 deg. Fah., and it must not vary more than two degrees either above or below this temperature. My room is heated by the circulation of hot water through pipes, and I have introduced levers to work the stop-cock, in such a manner that if I can get a power sufficient to lift twelve ounces one-eighth of an inch in two degrees of temperature, my present object will have been accomplished.

I wish the thermometer to get to 112 deg. by the time the valve is closed, and to descend to 108 deg. by the time it opens. I thought of making a mercurial thermometer, but I am afraid I cannot get one strong enough for the work and sufficiently sensitive. In Ure's Dictionary I find an account of a heat regulator, called a "thermostat," patented by him in 1831. This I have tried in two ways, and although I made one that would move itself one-sixteenth of an inch for every degree of variation, it would not move a single ounce beside.

I give a brief description: I took a bar of hard-hammered brass and one of untempered steel, each seven feet long by three inches wide, and one-eighth of an inch thick, and riveted them together, face to face, with brass rivets two inches apart. The compound bar I bolted to a stationary block at one end, the other being free to move by the unequal expansion of the two metals. Can you advise a more efficient regulator? W. M. BROWN.

San Francisco, Cal.

[It seems to us that a movement of one-sixteenth of an inch for every degree of variation might be sufficient to operate mechanism capable of opening or closing a valve in a pipe. It would undoubtedly require a nicely-adjusted medium, but that does not seem to be without the limits of mechanical ingenuity. We can see no reason why a mercurial, water, or air thermometer, if of sufficient capacity, might not be made to give motion enough to a float on the surface of the fluid to answer the end proposed. The attention of our correspondents is called to this case. A regulator sufficiently sensitive might have many useful applications.—EDS.

The California Target.

MESSRS. EDITORS:—The target, represented in your last number, is a very interesting one to those who know the facts concerning it, without which, as you justly state, its value is very uncertain.

As I happen to be in possession of these facts, I send them to you, rather than leave them till you can hear from your correspondent in San Francisco.

In the first place, the distance shot was 40 rods (220 yards) instead of 40 yards, as you stated. The gun was manufactured by Hiram W. Smith, of Boston, and its character is well known in this section, where it has won many matches. It was sent to Dr. Pardee, of San Francisco, last fall. The target represented by you was shot in a match for $1,000; and I believe is the shortest string on record of an equal number of shots at that distance. The weight of the rifle, I believe, is 30 lbs.; the shooting was from a rest and with telescope sights.

H. W. S. CLEVELAND.

Danvers, Mass., July 31, 1866.

Cement for Millstones.

From a correspondent, J. A., we have the following:—

MESSRS. EDITORS:—Having noticed in your issue of July 14th, a solicitation from millers for a recipe for a cement for open millstones, I send you the following, which I can vouch for being *the thing:* Melt as much alum as is thought necessary for the work; while hot add a little white lead, say, one ounce to one pound of alum. Let it get well mixed and pour into the stones while hot. Plaster of Paris is most commonly used, but is much inferior to the above. I never heard of any one using lead until I saw it in your paper.

[It seems to us that the white lead would be anything but what is needed for millstones. White lead is noxious and entirely unfit to be used in conjunction with any mechanical means of preparing animal food. It is an oxide of lead, and is deadly when brought in contact with human or other animal organisms. It is but a short time since a large number of persons were poisoned by flour ground in mills, the stones of which were repaired with lead. The white oxide of lead, commonly called white lead, is scarcely less obnoxious to organic life than the metal in its natural state.—EDS.

Old Rubber Car Springs.

MESSRS. EDITORS:—Please inform me through your valuable paper to what use old "rubber car springs" can be put. Can they be re-manufactured into springs, or can they be made into a paint suitable for freight cars? Any information in regard to the above will be thankfully received.

J. B. HOXSIE, Supt. East Tenn. & Va. R. R.

Knoxville, Tenn., July 21, 1866.

[Many companies have large stocks of old springs on hand, and they, in common with our correspondent, will doubtless be interested in knowing that, free from iron fittings, they are worth 8 cents per pound in this city. Regarding the paint, it is cheaper to buy it of parties in the trade than to attempt the manufacture on a comparatively small scale.—EDS.

Pyrophorus.

MESSRS. EDITORS:—The "*poudre de feu,*" which I find mentioned in your paper of July 28th, is made as follows:—Take equal parts of alum and brown sugar; dry out the moisture in an earthen dish over a slow fire, and pulverize; then put the mixture into a glass vial, and lute the mouth with clay, leaving a pin-hole for the escape of gas. Next, place the vial, surrounded with dry sand, in a crucible. Place the crucible on the fire, and as the heat increases, try the pin-hole occasionally with a lighted match, and you will discover the gas take fire and burn with a small blue flame. Continue a red heat about ten minutes after the gas ceases to burn, and then cool down; after which the contents of the vial may be again reduced to a powder by shaking, and transferred to pocket cases. When poured out in the open air from the elevated hand, it forms a shower of red sparks. It may be made the source of a hundred amusing tricks and experiments. I used to prepare it, however, for a purpose entirely distinct from its peculiar property of becoming red hot when exposed to the air. ARGENT.

Indiana, July 3, 1866.

The Piston of a Steam Engine.

MESSRS. EDITORS:—Where is the piston of a horizontal engine when the connecting rod is at right angles with the crank? It may be rather a silly question to ask, but no one can answer us as yet. By answering it you will greatly oblige two young men who sign themselves

GEO. G. AND IRA N.

New York, July 28, 1866.

[The piston is in the cylinder and at a point determined by the length of the connecting rod and length of the stroke. It is not midway between the ports, but with a very long rod and a very short stroke it comes pretty near it. The connecting rod is not "at right angles with the crank," but at an acute angle when the crank is vertical.—EDS.

Bridge Walls in Boiler Setting.

MESSRS. EDITORS:—I notice your correspondent, F. W. B., says a vicious habit in setting boilers is in contracting the opening over the bridge wall. Perhaps I am in danger on account of doing the same thing.

I have a boiler 48 inches in diameter, 22 feet long, the bridge wall back of the grate bars is made in a circular form, 4 inches at the center of the boiler, and increases on either side to 8 inches at the water line. I find the small space—four inches—causes the flame to wrap the boiler instead of running back in a column, as is the case when twelve to eighteen inches space is made under the center of the boiler, and square across to the walls. I find the greatest economy in fuel with this circular hearth made back to the stand pipe. If there is danger from this style of setting boilers the public ought to know it. Is F. W. B.'s theory correct, or mine, as described?

M. R. LEMMAN

Columbus, Miss., Aug. 2, 1866.

[There is no doubt but our correspondent finds economy in setting his boiler in this way, as it is a sort of regenerative furnace, wherein the egress of the products of combustion is delayed until they ignite. At the bridge wall, and for a few inches each side of it, the most intense heat should be found. It is not desirable that one part of the boiler should be heated more than the other, or that such extreme heat should be found. Four inches is too narrow an outlet for a boiler forty-eight inches in diameter, and although it may accelerate the draught and promote combustion, there is danger that the flame may reach portions of the shell above the water line and over-heat it. We recommend that the opening be made eight inches all around, at least; very little difference will be found in the fuel.—EDS.

THE Custom House at Portland, Me., built of granite, and as thoroughly fire-proof as any building in the city of New York, penetrated by the all-searching heat, still stands a scarred and crumbling wreck amid surrounding ruins.

Modern Methods of Business.

A great change is taking place in our times in respect to the methods of business. Company concerns are superseding individuals, and great capitalists are taking the place of small. Manufactures are being systematized and concenerated, and the forces of water and steam made to supersede and supplement, as far as possible, human and animal labor. All our small and rapid rivers are at work, and most available water powers improved to relieve and aid human toil. Great manufacturing establishments and cities are constantly springing up, and going rapidly ahead.

We take the liberty to suggest connecting with the Niagara ship canal a Niagara water-power canal, that shall be able to drive the looms and spindles, and all the other machines and implements, of a large manufacturing city. The expense would be comparatively slight, of connecting this second improvement with the first, and the two would constitute works of great magnitude and value.

The vast power of Niagara Falls is there to be utilized, and ought, after so long a period, to begin to answer its beneficent purposes. Buffalo would then be one day eclipsed by Niagara city, and the heaviest manufactures of the continent be concentrated in the vicinity of its greatest natural curiosity. Manufactures would be distributed easily to the east, but would probably go mainly to the west.

Niagara Falls are very much in the way of navigation, but they may yet furnish vast powers for work, and prove an invaluable auxiliary to human labor.

The attraction of manufacturers to the localities of great water power is seen in New England on a great scale. Every thing possible is going into cities, and manufacturers are being rapidly concentrated both in great cities and in great establishments.

Business is also being wonderfully divided up. The beautiful city of Lynn makes women's shoes. No shoes for men or boys, and no boots are made in the city. Its own supply comes from abroad. But all the makers of women's shoes have for some years been flocking into Lynn, from surrounding districts. Lawrence, Manchester, and Fall River, are largely engaged in the cotton and woolen manufactures, and their establishments are constantly multiplying and being enlarged.

In several departments of production the private methods and small establishments of past years are entirely abandoned. Clocks and watches used to be made in Europe, and the former in this country, by men with small capitals. Both are now large company concerns, with which small capitalists cannot posibly compete. Cotton, woolen, and linen goods used to be home manufactures; they are now the products of great company concerns, and the woolgrower can as little afford to manufacture his wool in small parcels by hand, as to throw it away. The manufacture of boots, shoes, and clothing are following in the same way.

Great establishments are doing immense business in these articles, and are superseding small concerns entirely by ruinous competitions. Great establishments, with ample machinery and other facilities, cheapen products till small concerns cannot afford to produce them. At the same time that products are cheapened, wages are raised by new and profitable demands. One great company prospers. Another enters the field and builds, and works along side of it. If the two prosper, a third goes into the business, and so on, till it is filled to its utmost capacity, when profits decline. Company competition operates on the same principle as that of individuals. Companies compete for the best help and the quickest sales, and thus perpetually drive labor up and products down by natural laws.

Many are troubled with this inevitable progress of affairs, and anticipate from it the oppression and injury of the poor. But this trouble may be spared. Great corporations are the friends of labor and drive it up by competition with each other. Their interest is to sell quick, and to extend and multiply their concerns as long as they can do business profitably. The public is not only thus secured from harm, but made the recipient of great benefits in the very particulars in respect to which great corporations are feared, that of enhanced prices and cheapened products.—*Utica Telegraph.*

The Opium Trade.

The *East Indian Budget*, just laid before the British Parliament by Lord Cranborne, presents some curious facts relating to the opium trade as a source of revenue. The gross revenue of the Government for the years 1864-5 amounted to £47,041,000, showing a small surplus beyond expenditures, owing to the unexpected receipts from the customs tax on opium. In this item there is a large gain over the previous year, which yielded £7,361,000, the increase being £1,277,000.

These amounts are paid wholly by the Chinese, by whom the drug is consumed. The estimated receipts for the current year are put at a still higher figure—larger than were ever before realized, with rare exceptions. The importance attached to opium as a source of revenue may be inferred from the remark of Lord Cranborne, that "it is evident that the perfection of our Indian budget, the attainment of a good balance sheet, depends upon our accurately estimating the yield of opium."

Formerly this source of relief was regarded as precarious, but it is now believed that the demand of the Chinese for opium can be depended upon as safely as English chancellors of the exchequer can rely upon the demand for gin and beer. It is thought probable that the former will continue to be as passionately fond of their favorite drug, as the latter are of their indespensable beverage. "It is on the opium revenue," we are told, "that Indian finance ministers are saved or lost."

The chief danger is that the Chinese may be enabled to satisfy their taste from some other market, should the cultivation of opium be attempted elsewhere with success. The Indian Government derives little direct profit from the vices of native subjects, with whom abstinence from intoxicating liquids is a religious duty. Nor do they show a propensity for poppy juice. They are hopelessly temperate. England can derive no profit from pandering to their vices.

MISCELLANEOUS SUMMARY.

THE indications are that the yield of coal this season from the mines will be so large as to prevent a further advance in prices, and may even cause a material reduction.

The Cape Ann (Gloucester) *Advertiser* says:—"There never before was such a scarcity of mackerel in our market at this season. At this time last year from thirty to forty sail of baymen had arrived home, and business was quite lively on the wharves. The fish speculators find it rather dull pickings at the present time, and there is quite a lively competition among them when a ship arrives. Prices are daily advancing."

THE CUNARD CONTRACT.—The Cunard mail contract expires next year, and it is anticipated that the postage of the letters will alone be sufficient to maintain the service, the shilling rate being reduced to sixpence, and all the letters being sent to New York. One half of the letters now go to Boston.—*Engineering.*

CLEANSING HAIR BRUSHES.—Soda, dissolved in cold water, is better than soap and hot water. The latter very soon softens the hairs, and the rubbing completes their destruction. Soda, having an affinity for grease, cleanses the brush with very little friction.

THE Fair of the New England and Vermont State Agricultural Societies will be held on the grounds of the Windham County Park Association, at Brattleboro, Vermont, September 4th, 5th, 6th and 7th, 1866. Premiums amounting to over $6,000 will be offered in the various departments. Arrangements have been made with nearly all the New England railroads for the transportation of stock and articles free, and conveyance of passengers, attending and retutning, for fare one way.

THE manufacture of menhaden oil has got to be a very large business, and it is estimated that about 100,000 bbls. will be secured the present season. It takes the place, to a large extent, of dark whale oil for curriers' use, etc. An establishment for the manufacture of fish oil is being erected in West Yarmouth. Schools of porgies are now, and have been this season, numerous off that place.

THE population of St. Louis, according to a recent census, is 207,000. In 1860 there were twelve manufacturing establishments in that city, with a capital of $100,000; in 1865 there were sixty-two establishments, employing two millions and a half of capital, being more than a million and a half in excess of the capital invested in the entire State in 1860. The manufacture of india-rubber goods has also just been commenced by a well-known firm.

AN artesian well in process of sinking, at the Union Stock Yards, in Chicago, Ill., has reached a depth of 446 feet. The last ninety feet have been bored through the solid rock. There were at one time indications of oil, but these have disappeared.

A LITERARY gentleman in Washington is afflicted with what is called the "pen palsy," an affection which is supposed to be caused by the use of French copying ink, which, it is said, contains arsenic. Both his hands and feet are badly swollen, and his health is in a precarious condition.

A MAN named Jones, and his little son, were killed at Piqua, Ohio, the other day, by a stroke of lightning. Perfect photographs of the trees under which they were standing at the time were imprinted upon their bodies.

THE American Silver Steel Co. have purchased Mather's Point, in Bridgeport, Conn., and are about to erect a large rolling mill for the manufacture of bar iron and steel. The company own the celebrated "Mine Hill," in New Milford, and will make their iron and steel from the ore obtained at that hill.

ARTESIAN WELL.—The new artesian well at St. Louis, for the Insane Asylum, was commenced April 1st last, and has now been bored to a depth of over 1,000 feet. It is to be carried down 3,000 feet, unless a good supply of water is obtained at a less depth. Mr. Wm. Rumbold is the chief engineer, and Chas. W. Atkeson has charge of the work.

WE learn from Jamaica that the experiments in crushing bamboo by machinery have entirely succeeded, and by that means a much larger trade can be done in the fiber. It is intended to establish several mills to crush the bamboo in different parts of the island. Very little bamboo fiber is sent to England, the United States importing nearly all that is manufactured. The value of the bamboo grown on the island is estimated at nearly one million dollars.

BAIRD'S PUBLICATIONS.—The attention of our readers is directed to the advertisement of Henry Carey Baird, Industrial Publisher, in the present number, which will be continued in future numbers, giving a list of the most popular and useful of his scientific and industrial publications. Every week we receive inquiries for treatises on practical subjects, and are obliged to refer correspondents to Mr. Baird. The publication of this catalogue will, therefore, be of great service to our readers who desire to know where works on scientific and practical matters are to be obtained. Catalogues of his publications will be sent on application to Henry C. Baird, 406 Walnut street, Philadelphia.

COAL OIL FOR FUEL.—The London correspondent of the New York *Times* gives an account of the use of coal oil for the production of steam. It was found by experiments that American coal oil would evaporate water at the rate of one pound of oil to thirteen of water, while oil produced from English shales would evaporate eighteen pounds of water, or double the power of coal—the economy both of space and weight being very great. The fires are under the entire control of the engineer; no stokers are required, and the furnace doors are never opened nor are the plates ever burned out. The oil produced from North Carolina shales ought to be as good as the best English.

Supplement.

Our readers will observe that we have been compelled to issue a supplement with this number. This is in consequence of the large increase in our advertisements and our Patent Office business. We would recommend that these supplementary pages be as carefully preserved for filing and binding as the body of the paper. They may be found valuable hereafter for reference.

THE Pittsburgh *Republican* states that at Rising Sun, Ind., on the Ohio river, on the 14th of July, while the sky was perfectly clear so far as the eye could reach, and the sun was shining brightly, a vivid flash of lightning appeared, followed by a long and sharp peal of thunder. The electric fluid struck a church and three dwelling houses. At the same instant a little girl was killed outright, and a little boy had his clothing stripped completely off his body, not excepting his shoes, all of which had the appearance of having been cut with a sharp knife. The boy was only stunned and slightly injured in one of his legs. Another boy in the same vicinity was also struck at the same time, but was more seriously, although not fatally, injured than the boy who had his clothes torn off.

AN interesting experiment has been made on Mont Cenis, in presence of the Minister of Public Works, in France, who accompanied the chief director and several engineers. The part of the railroad already completed, which ascends by a winding inclined plane, was traveled over by a train composed of several carriages at a speed of about 11 miles an hour ascending, and 15 descending. The highest gradient was 8½ per cent, and several curves were at an angle of only 40 degrees. The works on the Italian side are to be finished by the end of next October, so that it is expected that by next November Italy and France will be united by an unbroken line of iron.

SOME French *savant* has been writing about plants having green and white blood. When he gets through with these important researches we hope he will be able to find out whether or not the moon is made of green cheese or *Schweitzer kase*. He may be able to prove the fact that the moon is the Dutchman's heaven.

RECENTLY an eruption of an artesian well took place in a garden adjoining the church of St. Agnes, in Venice. The walls of the church were cracked in all directions. The substance vomited consisted of black ashes and a suffocating gas, the expansion of which is supposed to have caused the outbreak. The water which was thrown up reached as high as the top of the church.

THE body of an Australian native, which was found in a state of petrifaction, has been sent to England. This singular specimen was found in one of the limestone caverns which abound in the plains of Mosquito, in the south of Australia. The body was discovered in the natural position of a sleeping person.

FALL RIVER is growing rapidly from the great increase in manufacturing. When the mills now in process of erection are completed, it will have more spindles than Lowell, and be the first city in America in the amount of cotton and woolen goods manufactured. A large part of the machinery is moved by steam.

ON Tuesday, the 7th inst., ninety-two patents were ordered to issue to inventors whose applications were prepared at the SCIENTIFIC AMERICAN Patent Agency.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees :—

CHILDREN'S BED-CLOTHES RETAINER.—M. L. THOMPSON (assignor to himself and E. L. CHILDS, 189 President-street, Brooklyn, N. Y. Patented November 28th, 1865).—Much annoyance and trouble is given to mothers and nurses by children constantly getting uncovered at night, owing to their restlessness. Their feet or hands are almost constantly in motion, and it is impossible to keep children covered unless they are continually watched, and if neglected they become uncovered, and serious colds are often the result, especially in the spring and winter seasons, which often develop into some ailment fatal to the child. The object of this invention is to produce a simple means for retaining the bed-clothes in place over the child, no matter what position it may assume, and for this purpose a ring or collar of suitable construction is employed, which is to be placed around the child's neck, and to which the bed-clothes are attached.

COFFEE ROASTER.—H. B. MASSER, Sunbury, Pa.—The object of this invention is to obtain a simple, portable, and economical device for roasting coffee, one which may be manipulated with the greatest facility, both as regards the stirring of the coffee while being roasted and the removal of the same, when roasted, from the device.

FAN MILL.—CHARLES K. EHLE, Greenbush, Wis.—By means of this fan mill, which is simple in construction, strong and durable, the wheat may be easily and rapidly freed from oats, straw, and chaff, and, at the same time, it answers every purpose for cleaning all other kinds of grain.

GRAIN CLEANER.—C. F. BAYLER, Clinton, N. J.—This invention relates to a device for clearing grain which consists in the use of a reciprocating screen operated in a novel way, whereby cockle and shrunken grain are separated from the sound grain in a thorough manner.

DEVICE FOR HOLDING STAPLES WHILE BEING DRIVEN.—ALBERT C. BETTS, Troy, N. Y.—This useful device is for holding staples and is designed to facilitate driving them, and it is more particularly applicable to the making of wire fences where the wires are secured to the posts by means of staples.

GANG PLOW.—WILLIAM BATTELL, Quincy Ill.—This invention consists in a peculiar construction and arrangement of parts whereby lightness of draught is obtained, and the plows rendered capable of being manipulated with the greatest facility, while simplicity of construction prevents any of the parts getting out of repair or working order.

PROPELLER SCREW.—WM. E. DAVIS, Jersey City, N. J.—This invention consists in an improved mode of constructing screw propellers for steamships, by forming them of separate blades of boiler iron, fastened with screw bolts on the shaft, making the propellers much stronger, lighter, and cheaper than when cast, connected in one piece, as usual. If a blade is broken, even at sea, it is easily replaced.

FORGING PISTOL AND RIFLE FRAMES.—CHARLES E. BILLINGS, Windsor, Vt.—This invention relates to the forging of pistol frames, and consists in subjecting the blanks to a series of dies of suitable shape therefor.

TWEER FOR BLAST FURNACE.—JOHN BAYLISS, New York City.—This invention consists in a novel arrangement of the air blast, whereby combustion is increased and also the amount of heat generated.

TRAVELING BAG.—NICHOLAS GROEL, Newark, Essex County, N. J.—This invention particularly relates to the traveling bag frames, and its object is to strengthen the two jaws of the frames at the points where they are hinged together.

PICKER MOTION FOR LOOMS.—HOSEA ELLIOTT, Globe Village, Mass.—This invention relates more especially to power looms, and it consists principally in throwing the shuttle independent of the cam shaft, so as to secure a uniform pick motion whatever the speed of the shaft may be.

FENCE.—WM. H. BROWN, Stockwell, Ind.—This invention consists of the combination of connecting blocks and inclined corner stakes or braces with the panels of the fence, and in the combination of long poles or rails and stakes with each other, and with the panels of the fence.

FLOUR BOLT.—J. C. BLYTHE, Perry, N. Y.—By means of this invention flour may be bolted faster and more evenly than with the bolts now in common use. It consists in combining round hoops with the arms, ribs, and cloth of a flour bolt, in such a way that a space may be left between the ribs and cloth between each pair of hoops, so that the flour may be in contact with the cloth all around the bolt.

SAW SET.—JOHN LYLE, Newark, N. J.—By means of this improvement a saw may be set much or little, without the possibility of warping the blade or setting the teeth untrue.

GANG PLOW.—SAMUEL HUTCHINSON, Griggsville, Ill.—This invention relates to an improved means for regulating the depth of the penetration of the plows, and also to a means for raising and lowering the plows and retaining them in the ground when the device is at work.

SPOKE TENONING MACHINE.—OLIVER VANORMAN, Ripon, Wis.—This invention has for its object to furnish an improved machine for thinning and tapering the tenons of carriage wheel spokes.

FRUIT GATHERER.—S. MELLINGER, Jr., Mount Pleasant, Pa.—By this invention a fruit gatherer is produced, which can be used with the utmost ease and rapidity, and without injuring the fruit.

WOOD-SAWING MACHINE.—JAMES D. MATTHEWS, Bowling Green, Ohio.—With the wood-sawing machine embraced in this invention a great economy both of time and labor is effected, the machine being simple in construction and effective in operation.

SIDE SADDLE.—CLARA A. BARTLETT, Oakland, Cal.—This invention consists in so attaching one of the horns of the side saddle to its tree or frame that it can be dropped down into such a position as to allow to rider to mount or dismount with the greatest facility and ease.

WASHING MACHINE.—ALBERT JOYNER, Elton, Wis.—This invention consists in a removable fluted or grooved concave, having perforations through it for permitting the water to rise underneath the clothes which are being washed.

MACHINE FOR DRILLING ROCK.—R. A. THOMAS, Damascus, Cal.—This invention consists in an improved machine for drilling rock, being especially adapted for tunneling through slate-bed and other similar descriptions of rock.

CALORIMETER.—C. W. COPELAND, New York City.—When the size of the boiler tubes is too large, an unnecessary amount of fuel is consumed, and it is common to insert thimbles in the ends of the tubes to reduce the draft. These thimbles prevent the convenient cleaning of the tubes, and also arrest the ashes. In the present improvement the thimble or calorimeter is made in the form of a half moon, and occupies the upper portion of the tube end, thus reducing the draft, and holding the heated gases in the upper part of the tubes, but presenting no obstruction to arrest ashes or interfere with the cleaning of the tubes. An excellent improvement.

DEVICE FOR MARKING GROUND FOR PLANTING CORN.—PRESTON MCQUAID, Wenona, Ill.—This device is for marking off ground for planting corn in check rows, and it consists of three wheels placed at a suitable distance apart, within a proper frame, and the central wheel arranged or applied in such a manner that it may rise and fall to admit of the several wheels accommodating themselves to the inequalities of the ground over which they may pass.

LOG-SETTING DEVICE FOR CIRCULAR SAW MILLS.—J. A. GRIGGS, Charleston, Ill.—By this device logs may be set to a circular saw, by the sawyer himself, without the aid of an assistant. It consists in setting the log by means of a bar or handle passing over the log and saw, and within convenient reach of the sawyer.

HYDRAULIC MAINS FOR GAS WORKS.—J. N. STANLEY, Brooklyn, N. Y.—The object of this invention is to cast the upper parts of the tubes leading to the hydraulic main with one side of the latter so as to communicate with the main below the level of the fluid therein, whereby the gas, when it escapes up through the fluid in the main, has a free, unobstructed passage in the latter above the fluid.

HOT AIR FURNACE.—HENRY WHITTINGHAM, New York City.—This inventor has three different patents on hot-air furnaces. One relates to a hot-air furnace, the combustion chamber of which is surrounded by an air chamber, to which air is admitted from below, and through which extend a series of vertical and horizontal flues, the vertical flues to conduct the cold air to the horizontal flues, where the same is heated, and whence it passes into a hot-air chamber to be distributed to the various rooms or compartments in a building.

TYPE-SETTING MACHINE.—CHARLES BAER, New York City.—This invention relates to a machine in which one type after the other, as indicated by the pressure of the hand on suitable keys, is taken from a series or radiating type cases by a receiver, which is secured to a vertical shaft, on which it revolves, and which is so arranged that its end sweeps past the inner ends of the radiating type cases. The line of types in each case is subjected to the action of a pusher, which has a tendency to force the same toward the center of the axis on which the receiver revolves, and said columns are retained by spring hooks, which catch over the edge of the first type in each type case, and which connect with the key in such a manner that by depressing the inner end of one of the keys the corresponding spring hook is raised and a type passed out of the appropriate type case into a small chamber, from which it is taken by the revolving receiver. Suitable cams on the inner ends of the type cases serve to push the type into the revolving receiver far enough to enable a spring hook to catch hold of them and retain them, and similar cams on the end of the revolving receiver retain the line of types in the type cases, while that type which, by the pressure on the key, has been allowed to detach itself, is taken off by the revolving receiver.

NECK-TIE HOLDER.—THEODORE ROSENTHAL, New York City.—This invention relates to a device intended to fasten scarfs, butterflies, and neck-ties in general, to the upper shirt button, by means of two curved spring jaws, which project from a spring or plate to which the neck-tie is secured, the curved jaws being so shaped that they can be sprung over the shank of the button, and that they clamp the same tightly, so as to prevent the neck-tie becoming disengaged spontaneously.

WASHING MACHINE.—ADOLPH T. KULHMANN, Glenhaven, Wis.—This invention relates to a washing machine which is so constructed that it soaps the clothes, boils them, washes them, and wrings them; and which, after the washing has been finished, can be used as a table.

BOX FOR COLLECTING FARES IN OMNIBUSES, ETC.—J. B. SLAWSON, New Orleans, La.—The principal object of this invention is to arrange a box for collecting fares, so that it is adapted for currency as well as for coin, that the fare deposited in the box can be seen by the driver as well as by the passengers; and furthermore, that the possibility of withdrawing from the box a portion of the fares deposited therein is absolutely prevented.

COMPOUND FOR GRINDING AND POLISHING.—N. A. BUHLE, New York City.—This invention relates to a compound which, when formed in rollers or bars, can be used with great advantage for grinding and polishing articles of metal of any desired description.

WASHING MACHINE.—WILLIAM M. DOTY, E. P. DOTY, AND ELLIS DOTY, Janesville, Wis.—This invention consists in the use of a spring wound on each of the fulcrum pins of the oscillating washboard, with its ends extending from the fulcrum pins in opposite directions, one to bear on the edge of the tub, and the other under a pin projecting from the bracket which forms the bearing for the appropriate fulcrum pin, so that in depressing the handle each spring is wound up and the pressure on each fulcrum pin is balanced, one end of the spring pressing up and the other down, and said pins are prevented from wearing out. It consists also in combining with the washboard, flanged segmental cheek pieces, which are grooved to receive the handle, and so formed that they prevent the water from splashing out over the ends of the tub; and also in the arrangement of cleats on the ends of the tub, in combination with the upper ends of the legs, which are secured to the tub, each by one screw, in such a manner that the end pieces of the tub are free to expand and contract without being liable to crack, and at the same time the legs are firmly held in position.

NEW PUBLICATIONS.

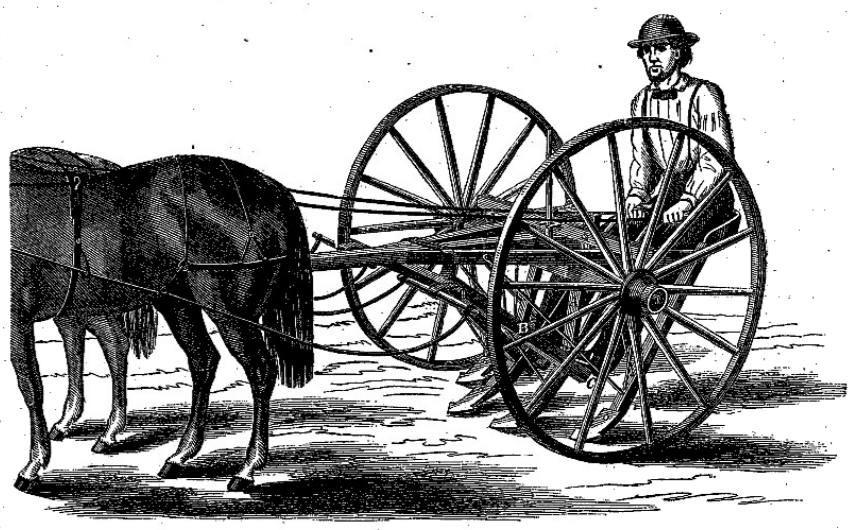
THE TURNER'S COMPANION—Containing Instructions in Concentric, Elliptic, and Eccentric Turning, with illustrations. Henry Carey Baird, 406 Walnut street, Philadelphia.

There is much in this volume of interest to amateurs, and some of value to practical workers. The suggestion of the author, in his preface, that the foot lathe is a proper machine for the use of "the sex," we regard as timely and felicitous. There is no adequate reason why women should not use the lathe as a means of exercise, and, at the same time, an agent for the production of beautiful geometric forms, pleasing to the eye, and of practical utility. For some of the plates we have not much that is commendatory. The representation of circles in perspective, by well-defined lozenges, violates all rules of art, and the handles of tools, made in accordance with the illustrations, would be anything but "handy" and convenient. Despite these drawbacks, however, the volume will be found to be a useful adjunct to the *repertoire* of the amateur, and of value to beginners, and some of the recipes are just what is needed, furnished in a convenient form.

Improved Corn Cultivator.

Quite recently we ran up through the valley of the Mohawk River, where vast fields of corn are grown, and side by side, scarce twenty rods apart, were two men at work; yes, two men and one woman. One man had a cultivator, and as he drove he turned over the shining soil against the growing crops, and rode as he drove. The man and woman bent to their work, he earnestly, she in a stiff, ungainly way, as might be expected of a woman in an employment unsuited to the sex. The contrast between the two methods was too marked not to be noticed, and we wondered how any man could be so short-sighted as to use manual labor where machines are provided which will do better work than he can, in half the time.

In this engraving we illustrate a simple and efficient cultivator, which has met with much popularity at the West. There is no machinery about it, and any one that can drive can manage it. In brief, the axle has a triangular frame fixed to it, on one end of which is the draft pole, and on the other two vertical beams, A, which carry the plows, B; the cultivators attached to the plow beams are of any desired shape. The plow beams are so fixed as to be readily moved in any direction, and are capable of being easily guided between the rows. This is accomplished either by grasping the handles, as seen in the engraving, or by placing the feet on stirrups on the plow beams. In this way a vast amount of work can be done in a satisfactory manner, and the cost will be much less than by hand labor.



STOVER'S CORN CULTIVATOR.

It was patented February 27, 1866, by Andrew T. Stover, of Sandyville, Iowa.

RAIN GAGES AND RAIN FALL.

Scarcely a day passes in this section of the country but that cooling showers descend during the night, refreshing the earth, parched during the day by the glaring sun. This moisture, returned in the form of rain more rapidly than it was abstracted, is generally the result of the union of two or more volumes of humid air, differing from each other in temperature. When mingled in the mass, or rather cloud, it is incapable of retaining the same amount of moisture that each did separately. If the moisture is over-abundant it descends in showers; if but slight, it floats in the air as a cloud, and long before showers fall we see masses of vapor skurrying before the wind until all are mingled in one.

The average yearly rain fall varies greatly, being the most in the tropics. As a general rule, the higher the average temperature of a country, the greater will be the rain fall.

In tropical countries the average amount is 95 inches, in the temperate zone but 35. In hot countries the heaviest rain storms occur when the sun is at its greatest altitude, but the reverse is the case in the temperate zone, where dry summers are by no means exceptional, and long wet winters hold sway.

In many parts of the world it never rains, and the arrowy sheets of water, driving before the wind, are unknown; in others there are certain rainy seasons when the heavens open and the floods descend and cover the earth as of old.

The Island of Chiloe, and the country about the straits of Magellan are said to be the wettest places on the face of the globe. There it rains incessantly. In the northern part of the United States there are, on an average, 134 rainy days in the year; in the South not so many numerically, but the average rain fall is greater.

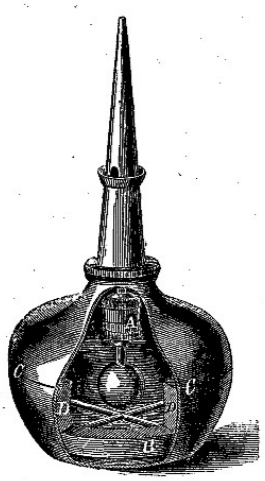
At San Luis, in the island of Maranham, the average rain fall is 280 inches, which is the greatest on the continent.

The quantity falling in a given time is measured by a gage. A common form of this instrument is a can with a floating piston and rod; as the rain falls it raises the piston, and the quantity is known by observing the graduations on the rod.

A better instrument is made by attaching a small tube to the side of a larger one, the two communicating at the bottom; the lesser being graduated shows the quantity which falls in any given time very clearly. Experiments made by the Smithsonian Institute show that a tube 6 inches long and 2 inches in diameter, connected with one half the diameter, gave the best results; a funnel-shaped plate inserted at the top improves it.

HOLT AND THOMPSON'S IMPROVED OILER.

In our issue of July 28th we illustrated a device, patented April 24, 1866, for preventing the oil from smearing the outside of the oiling can. We herewith present another form of the oiler, intended to maintain always an upright position. It can be used either with or without the globe-valve attachment, shown at A, which was fully described in the number referred to. The can is made of sheet brass,



silver plated, for the sewing machine, and weighted at the bottom, as at B, to bring it to an upright position when accidentally overturned. This is further assured by the form of the can. For common purposes the oiler can be cheaply made by constructing the lower section, from the line, C, of cast iron, thick as seen at D and B, which would further insure steadiness of position by increased weight.

Further information in regard to this neat contrivance can be obtained by addressing J. M. Thompson, 2d, or G. L. Holt, Box 1,058, Springfield, Mass.

PROTECTING BUILDINGS AGAINST LIGHTNING.

In our last issue we had an article on this subject but it did not exhaust the topic. We desire to say a few words additional in relation to ordinary protection against lightning.

Many buildings are now constructed, both in the city and in the country, with metallic-covered roofs, and very few are erected without metallic eaves troughs and conductors. In all such cases the efficiency of lightning protectors is impaired by the preponderance of conducting surface on the roof and down the sides of the building. This metallic covering, and these rain conductors, whether of tin, zinc, or lead, are better conductors of electricity than the building of stone, brick, or wood, and should be utilized as a means of protection against lightning. For this purpose strips of iron, zinc, or copper should connect the lower extremities of the water spouts with the damp earth, a well, or a running stream of water, and the eaves troughs should have a connection with the metal roofing and with the vertical conductors. Water is a good conductor of electricity, and when, in a thunder storm, the rain is pouring down the conduits of a building, their conducting properties are largely increased. Properly connected, these useful appliances can be made doubly valuable as harmless conductors of electricity.

In cities and enterprising towns there are systems of water pipes and gas conductors, of metal, ramifying in the interior of dwellings and other structures. Such buildings should be carefully protected outside. If the conducting medium, whether of water or gas pipes, preponderates in the interior of the building, the electric fluid may leave the external conductor and through a thick wall seek that which facilitates its passage to the earth. In such cases it seems that nothing but a rod, having numerous points for collecting the electricity and adequate means of conveying it innocuously to the earth, would be an effectual protection. Some authorities recommend a connection to be made between the system of water and gas pipes inside a building and the external conductor.

The question of insulation seems to be a disputed one, some insisting on thorough insulation of the rod, by means of a non-conducting substance interposed between it and the building, and others as strenuously maintaining its uselessness. It would seem to be unnecessary, if the conducting capacity of the protecting rod is greater than that of the building itself; and this, after all, is the most important requisite for a protector against the ravages of lightning.

The *Mahroussee*, built by Samuda, designed by Lang; oscillating engines by Penn; obtained the greatest speed on trial trip ever known, viz., 21¼ statute miles an hour. Length, 360ft.; breadth, 42ft.; depth, 29ft.; wheels, 33ft. diameter; tunnage, 3,141; horse-power, 800.—*Engineer*.

[This is in England. Our North River boats have frequently made 26 miles an hour. The *Chauncey Vibbard* ran from New York to Albany, 160 miles, in six hours and forty minutes. In deep water she averaged 24 miles an hour.—Eds.

A single establishment in Waterbury, Conn., uses 1,500 tuns of copper annually in the manufacture of pins, hooks and eyes, and other similar articles.

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SUBDIVISION OF LABOR.

It is claimed by some that the mechanics of twenty years ago were superior workmen to those who have graduated of late years. It is boldly asserted that mechanics, as a class, have deteriorated. We do not subscribe to this opinion, but we will point out briefly some of the reasons why the opinion is entertained.

Twenty years ago the apprentice to an industrial trade was taught all its mysteries, from the preparation of the crude material to the finish and ornamentation of the completed structure. The carpenter took the rough tree bole, and, by chalk line and broad-ax, marked out and hewed it to a square timber. With the common auger, mortising chisel, and mallet, he cut mortises and formed tenons. He framed and erected the skeleton of the building, covered it with boards, made the window-frames, the sashes, laid the floors, worked out the moldings, and finished the whole interior, even to lathing.

The blacksmith forged iron and steel, tempered tools, tired wheels, shod horses, ironed carriages, and repaired agricultural implements. The machinist sometimes chalked out designs, made patterns, and, perhaps, molded them, filed, chipped, planed, turned, bored, polished, estimated on work, built and repaired every sort of machinery, from a steam engine to a wheelbarrow, from a loom to a ship's pump.

All this is changed. No more do carpenters hew their timber; one machine mortises and another forms tenons. Houses are often erected without a single mortise or tenon. Joiners finish the interior. The doors, window-frames, and sashes are made at a factory. Even the glazing is done in large establishments devoted exclusively to that one branch. Lathers are an industrial community by themselves. The farrier shoes horses, the carriage smith irons carriages, the forger hammers away on a special class of work. He may manage the heavy jobs for marine and stationary engines, restrict himself to forging and tempering steel, or form the thousand and one shapes intended for cotton, flax, or woolen machinery; or he may confine himself to the business of forging and fitting tools for working the metals, and in this specialty he becomes an expert, as much above the man who forges and tempers stone drills and chisels as the machine forger is above the country blacksmith. The machinist is a "bench workman," a "planer" or a "turner." He may be an excellent man in a manufactory of cotton machinery, and comparatively worthless as a builder of locomotives. He may understand thoroughly the construction of looms or the process of making a good spindle for spinning, and be unable to set a valve on a steam engine. The valuable man in a marine engine establishment would be almost worthless in a gun shop.

So there is no parallel by which the workman of twenty years ago can be gaged with the workman of to-day. The whole trouble of comparing the past with the present consists in the necessity which our mechanical progress has compelled of subdividing the departments of labor. It cannot reasonably be expected that those who have been educated to perform a certain work, or do a certain department of work, can be thoroughly booked up in other departments, which, perhaps, may be closely allied to their chosen specialty. In versatility of talent, undoubtedly, the men who learned their trade when the arts were comparatively young, have an advantage. They were compelled to prepare their work, and consequently are the sort of men who are invaluable in a crisis. They are fertile in expedients. They understand what should be done under trying circumstances. They can devise "make-shifts," but not always can they produce a good job.

But our mechanics have not deteriorated. Those who confine themselves to one branch are usually better workmen than those who have spent fifteen or twenty years in practicing at a dozen differing processes. The lather, who makes that his specialty, excels the carpenter who turns from hewing timber to lathing rooms. The forger of tools can work and temper steel better than the blacksmith, who, in one day, forges the crank for a saw mill, tires a wheel, and tempers a knife blade. The machinist who has spent years in the construction of engines, knows more about steam and its agents for transmitting power than he who never repaired an engine.

We look upon this subdivision of labor as a direct means in the improvement of mechanics, as well as a sure method of progressing in the value of our products. Let a man—an apprentice—after learning the general principles of his business, devote his time and energies exclusively to that branch of his trade for which he is best fitted by education and natural taste, and there will in time be no means of drawing a comparison between the mechanics of twenty years ago and those of to-day, to the damage of the latter.

ELEVATED RAILWAY FOR NEW YORK CITY.

The increasing business of this city, year by year, makes locomotion, on the level of the streets, either by public or private conveyances in the roadway, or pedestrianism on the sidewalks, a difficult and vexatious matter. A force of police is stationed at various points on our most crowded thoroughfares, generally at the intersection of cross streets, for the sole, or main, purpose of protecting pedestrians from the attacks of drivers of vehicles. It is a passage of terror, this crossing the streets of the metropolis. The managers of harnessed horses seem to assume that they have the exclusive right to the roadway, even on crossings, and at corners sometimes whisk around them in a way that endangers the lives and limbs of pedestrians. The only relief to this crowded state of our thoroughfares is a means of conveying passengers between different points without coming in connection with th press of vehicles on the streets. Two plans have been proposed: One that of subterranean travel by means of tunnels, and the other of elevating the roadway of passenger cars above the street.

To the first there are solid objections. Manhattan Island, especially at its upper portion, is a mass of rock, which extends so far beneath the surface that, even for sewers, water pipes, and gas conduits, it is necessary to make a way by blasting through the solid rock. The City Council have granted to the "West Side and Yonkers Patent Railroad Company" permission to erect a line of elevated railway on each side of Greenwich street and Ninth avenue, from the Battery to and across Harlem River, on certain conditions, one of which is that the company shall pay five per cent of its earnings, less the National, State, and local taxation, into the city treasury. The tracks will be laid on iron columns at least fourteen feet high, placed along the curbstones of the sidewalk, twenty feet apart. A trial of the new enterprise will be made on Greenwich street; if this is successful, roads will be built on Broadway and the Bowery. The motive power will be a wire rope running over drums, which are to be driven by stationary engines at about half a mile apart. A device for griping the rope attaches to the moving line, and allows the carriage to be started or stopped at will. Stations for passengers will be established at certain points in the second story of buildings, when possible, or by outside stairways. The principal designs for this railway were prepared at this office.

COUNSELING OUR ENEMIES.

We doubt very much the statement of the *Engineering*, in an article copied in this issue, that "Mr. Fox, the Assistant Secretary of the United States Navy, was ready to allow our whole fleet to hammer at the *Miantonomoh* for two days, provided we would afterward allow that vessel to work ten hours' havoc on our ships in return." However much we may be inclined to believe what we have heard stated, that the visit of Mr. Fox to Europe, in the *Miantonomoh*, was a private speculation, we cannot believe he was allowed such latitude as this.

We are well satisfied with the fact that we can build the most invulnerable gunboats, and manufacture the most effective artillery, without proving these facts, in time of peace, to the satisfaction of those who may be our enemies, and, in consequence of our own foolish demonstration, be enabled to fight us with our own weapons. In our issue of July 20th we deprecated such an exhibition as that contemplated by Mr. Fox, and from the remarks of our foreign—especially our English—exchanges, we feel pretty certain that we are throwing away all the advantages of our costly and repeated experiments by this free exhibition of one of our most effective ships, armed with our best guns.

Recently Sir S. Morton Peto stated in Parliament that while in this country he had free access to our navy yards, and had explained to him the minutiæ of our naval architecture. Surely, it is enough that a foreigner—perhaps an agent of his Government—coming to this country, can be furnished a free pass to our shipyards and founderies, our fortifications, and other governmental institutions, and bear back with him the details of costly experiments, the results of which are invaluable. But, unsatisfied with this means of instructing the monarchies of Europe, we send to their own doors the completion of our exertions, and invite them to copy, and, if possible, improve on them.

This is an entirely new way of proving the *entente cordiale* between nations. The English Government do not open freely the doors and gates of their armories, founderies, and shipyards to the American traveler. Some of their processes are kept profound secrets; but, in our own case, the manner of fabricating our immense smooth-bore guns are minutely described in our journals, and the fact that a visitor is a foreigner is an *open sesame* to the establishments where the work is performed.

It is certain that we cannot hope to conceal, permanently, the results of our progress in naval and other warlike improvements; but, without this gratuitous advertising, they would become known only when we were engaged in a war, where they would be of service to us and of injury to our adversaries. Already the visit of the *Miantonomoh* has stirred the sluggish blood of our trans-Atlantic cousins, and we shall have plenty of copies of our monitors and big guns, all ready to operate against us when a rupture of our peaceful relations shall render it advisable.

REPORT OF THE REVENUE COMMISSION.—From the Secretary of the Treasury we have received the "Report of a Commission appointed for a Revision of the Revenue System." It is a valuable compendium of facts relating to nearly all branches of our industrial resources, obtained from persons directly interested in the business which they represent. Much information of an interesting character is also afforded in regard to the productions of other countries. The volume is a valuable addition to the industrial literature of the country, apart from its importance as a State document.

AN ABATTOIR FOR NEW YORK.

A new abattoir, somewhat on the French plan, is now in course of construction at the foot of East 106th street, New York. It is intended to supersede the slaughter houses at present existing, which cause a great deal of sickness and mortality in hot weather among those who live in proximity to them.

The building, which is constructed of wood, is divided into three departments—the abattoir, legitimately so called, the size of which is 200 feet by 20 and 19 feet high; the pen for inclosing the cattle previous to killing, which is 200 feet by 40, and which is again divided into 20 smaller pens; and the fat-melting room, 120 feet by 20.

It is built facing the river, upon piles driven into the ground below high-water mark, and has a platform on the river side with gutters and gratings to carry off all refuse to below low water mark. It is well ventilated by a tower in the center of the room, and the appliances for draining the floor are admirable. The builder is Mr. G. A. Kingsland, Greenpoint. It will be ready for use by the first of September. The method of slaughtering the cattle is as follows:—

They are driven into the small pens, 50 in each, and one by one are taken into the abattoir and hoisted by their hind legs by a simple apparatus till the animal's head is just clear of the ground, when its throat is cut. After it is dead and has ceased to bleed, it is lowered, partly skinned, and rehoisted, when it is dressed and slid along two beams, for the purpose, to the other side of the room, where it is lowered by a crane into an ice boat and sent down the river to the retail dealers.

There are 20 hoisting apparatuses, one opposite to each pen, thus enabling them to slaughter as many as 1,500 bullocks in one day. The blood will be used for fertilizing purposes, the fat melted and sold, and all other matter drained off.

As this abattoir is only for large cattle, it is proposed to build one on the same plan for sheep and other small stock. It is to be hoped the retail dealers will take advantage of this place and hire the use of the apparatus, thus doing much toward improving the appearance and health of the city. It is high time that the filthy and dangerous custom of driving animals through our streets should be stopped. The Health Board has this power, and it would be speedily exercised but for the interference of political judges, who disgrace the bench.

Spontaneous Combustion of Coal on Board Ships.

The Committee of Lloyd's Salvage Association has issued the subjoined report upon this subject, which has caused the destruction of so many vessels:—

There are a great many opinions afloat relative to the cause of spontaneous combustion, some ascribing it to the chemical composition of the coal, others to the absence of ventilation, either natural or artificial, while others, again, consider it is caused by moisture.

First, As to the chemical composition of coal. Owners know that one kind of coal is more liable to heat than another, and some will not ship that which is dangerous, but others are less scrupulous and ship all kinds. This might be partially checked by obliging owners to deposit at the Customs an analysis of the coals sent by them; they would be afraid of having any fire traced to their coal. But a better method is suggested by Mr. R. Hunt, F.R.S., of the Museum of Practical Geology, in England. A machine has for some time been employed for washing away the iron pyrites or bisulphuret of iron from the small coal at the pit's mouth previous to converting it into coke. While the coal is in transit, the oxygen acts upon the bisulphuret of iron, and evolves great heat; consequently, if the iron pyrites were excluded, a great source of danger would be obviated. The cost is only about 6d. a tun for the washing, and would be amply set off by the lower rate of insurance consequent on greater security.

Second, As to natural ventilation. It is chiefly small coal which heats, there being room in large kinds for the air to circulate between the lumps, but as the Chilian consumer requires small coal for smelting purposes, the only remedy is for shippers to send as large coal as can be used.

Third, Artificial ventilation. Mr. Hunt propses a method of securing this, but its efficacy has not yet been proved. It is to let down a pipe in the after part of the ship well into the coal, and to let down one in the fore part with the top communicating with the chimney of the cook's galley; this would produce an up draught and keep down the temperature of the coal.

Fourth, Moisture. Coals are in every way liable to get wet. At the pit's mouth they lay uncovered; in the wagons they are not in any way protected, the expense of tarpaulins being too great. While being shipped the hold is open to the weather, and at sea the hatches are frequently taken off, and the spray and sea air must necessarily damp them.

On the whole, the Committee commended to those connected with shipping coal that—

Coal of undue fineness or damp coal should not be shipped.

That a rod similar to those used in British ships should be used every 12 or 24 hours to ascertain the temperature of the coal.

That the proposition of Mr. Hunt for artificial ventilation should be tried.

That the coal should be washed previous to shipping.

"Gas for Less than Nothing."

Some of the English papers are parading paragraphs under the above heading, which assert that a Mr. Russell manufactures a gas from worthless vegetable substances which leave a valuable residuum; that the gas is of very superior illuminating properties, and by a simple apparatus can be made by any family, etc. The *Journal of Gas Lighting*, says:—

"From inquiries we have made, it appears that Mr. Russell's gas is manufactured from cocoa-nut shells, and that a high value is attributed to the residual charcoal. The process is by no means novel, for as long ago as Feb. 12, 1829, Edward Heard patented 'Improvements in illumination, or producing artificial light,' and cocoa-nut shells were one of the substances from which he proposed to manufacture his gas."

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING AUG. 7, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

56,871.—PUMP.—M. J. Atthouse, Waupun, Wis.

I claim the inserting of a glass, stone, or metallic tube, or lining, into the barrel of a wooden pump, and firmly holding it there by means of rubber, or other elastic rings, in the manner and for the purpose heretofore set forth.

56,872.—BRIDLE BIT.—Stephen D. Arnold (assignor to himself and W. F. Arnold), New Britain, Conn.

I claim the combination of the tube bit, a, with the clasp, d, ring, c, constructed and arranged substantially as and for the purpose described.

56,873.—ANCHOR STOPPER.—George H. Babcock, Providence, R. I.

First, I claim, in anchor stoppers, the employment of a rotating tumbler, B, adapted to receive the link, C, or its equivalent, on a point or points lying in, or nearly in, the axis of rotation, substantially as and for the purpose herein set forth.

Second, I also claim combination with the rotating tumbler, B, sliding rod, D, substantially as and for either or both the purposes above specified.

Third, I also claim, in combination with the rotating tumbler, B, the stationary mousing piece, a', substantially as and for the purpose herein set forth.

Fourth, I also claim an automatically-locking anchor stopper, consisting of the rotating tumbler, B, the sliding rod, D, or equivalent device, and mousing piece, a', substantially as herein described.

56,874.—COAL SCUTTLE AND SIFTER.—C. L. W. Baker, Hartford, Conn.

I claim as a new improved article of manufacture, the scuttle, a, sifter, d, when constructed and arranged substantially as and for the purpose as described.

56,875.—SIDE SADDLE.—Clara A. Bartlett, Oakland, Cal.

I claim a side saddle, having one of its horns arranged thereon and attached thereto, so as to be operated substantially in the manner described and for the purpose specified.

56,876.—WASHSTAND AND DESK.—D. W. Bashore, Erie, Pa.

I claim the arrangement of the water-heating tank, B, with the other two tanks, C and D, in a washstand, and the construction of the waste-water space, E, to adapt the stand to use as a writing desk, as specified.

56,877.—CRUSHING, ROLLING, AND KNEADING MACHINE.—Caleb Bates, Kingston, Mass.

First, I claim the swinging bars, c c, provided with the reversible bars, e e, containing the rollers, G H, and arranged as shown to admit of either roller, G H, being used as the nature of the work may require, substantially as and for the purpose set forth.

Second, The slides, I I, in combination with the spring, F, and screws, E, as and for the purpose set forth.

Third, The perforated receptacle, J, applied to the bars, c c, in combination with the reversible bars, e e, and rollers, G H, substantially as and for the purpose specified.

Fourth, The combination of the receptacle, A, provided with a curved bottom, in combination with the bars, c c, rollers, G H, and swinging bars, c c, all arranged to operate substantially in the manner and for the purpose set forth.

56,878.—GANG PLOW.—William Battell, Quincy, Ill.

First, I claim the attaching of the axles of the wheels, B B, of the machine to the rear parts of the bars, c c, the front ends of which are attached by hinges, a, to the front part of the frame, A, in connection with the segment bars, D, attached to the rear parts of the bars, c, and the levers, E E, attached to the bars, D, all arranged substantially as and for the purpose specified.

Second, The arrangement of the curved bars, L, attached to the plow beams by links, M, guides, N, with rollers, j, fitted in them, and the levers, O, all arranged to operate substantially in the manner as and for the purpose herein set forth.

Third, The construction of the clevises, H, as shown and described, to admit of the adjustment of the plow beams, as set forth.

Fourth, The thimbles, g, provided with the set screws, h, in combination with the clevises, H, rod, I, and adjustable stays, Q, substantially as and for the purpose set forth.

56,879.—TWEER.—John Bayliss, New York City.

I claim the tweer, A, consisting of the water chamber, B, connecting pipes, D E, water reservoir, C, elbow pipe, H, air chamber, I, and pipe, J, and having an opening, G, combined and operating substantially as and for the purpose represented and described.

56,880.—GRAIN CLEANER.—C. F. Baylor, Clinton, N. Y.

I claim the arrangement of the wheel, H, with its groove, h, lever, F, screen frame, D, with its screens, b b', as described, pressure roller, H, and rollers, C C, constructed and operating in the manner and for the purpose herein specified.

56,881.—PRIVY-SEAT COVER.—William Beach, Philadelphia, Pa.

I claim the cover or lid (B), hinged to the underside of the privy seat, and operated by means of a treadle, substantially as and for the purpose described.

56,882.—LAST.—W. L. Beardsley, Binghamton, N. Y.

I claim placing the bolt and spring in the body of the last in combination with the position of the vertical opening, D, through the heel of the instep block, and the mode of unlocking and detaching said block, as described.

56,883.—STAVE-CUTTING MACHINE.—John Bell, Lancaster, N. Y.

I claim forming the knife with a bevel on the upper side, and combining the knife, when so constructed, with the frame, A, and reciprocating bolt hopper, substantially as and for the purposes set forth.

56,884.—TOOL FOR HOLDING AND DRIVING STAPLES FOR WIRE FENCES.—Albert C. Betts, Troy, N. Y.

I claim a device for holding staples for the convenience of driving the same, composed of a case in which the staples are placed, a slide and spring, and a sliding bar which is actuated by a hammer for driving the staples, all being arranged substantially as shown, so that when one staple is driven by striking the bar, and the latter is moved back, a succeeding staple will be adjusted or thrown in line with the bar for the purpose of being driven, as set forth.

I also claim the placing of the sliding bar, G, in a hinged cap, F, arranged with the case, A, so that when said cap, F, is opened the bar, G, will be out of the way and the end of the case left open for the ready insertion of the staples.

56,885.—DIE FOR SWAGING PISTOL FRAMES.—Charles E. Billings, Windsor, Vt.

I claim the cutting dies herein described, for forming pistol and rifle frames; formed with cavities, c c, and otherwise constructed as specified.

56,886.—ELECTRIC TELEGRAPH.—John Blackie, New York City.

I claim the construction and application of a switch to a line connecting two batteries, in such a manner that the electric current between the batteries may be reversed or transmitted from one to the other of the poles of said batteries at will, whereby the batteries shall be made to neutralize each other, and thus remain dormant for the time being, substantially as set forth.

56,887.—FLOUR BOLT.—J. C. Blythe, Perry, N. Y.

I claim the combination of the partitions, E, and hoops, D, either or both, with the arms, B, ribs, C, and cloth of a flour bolt, when the said parts are constructed and arranged substantially as herein described and for the purposes set forth.

56,888.—HORSE SHOE.—Gustave Bonnet, New York City.

First, I claim the peculiar shape of my shoe, as shown in Fig. III.

Second, I claim the rubber band, F, in the combination, and for the purpose specified.

Third, I claim the combination of the shoe with the clamp, D, the hooks, E E, and the band, F, as and for the purpose specified substantially.

56,889.—TAPPING BARREL.—William Boynton, Auburn, N. Y.

First, I claim the solid plug, F, for shutting off the contents of the cask, as above set forth.

Second, Closing the end of the faucet, G, by means of a solid plug and projecting therefrom the tenon, J, for the purpose above specified.

Third, The apertures in the thimble, A, marked 123, and the corresponding apertures in the screw portion of the faucet, H, marked 45 and 6, when used as and for the purpose specified.

56,890.—BREECH-LOADING FIRE-ARM.—Isaac Bradley, Hartford, Conn.

I claim the arrangement of the spring slide, I, in the stock, A, operating with the breech piece, G, provided with the lug, M, in the manner and for the purpose herein specified.

56,891.—STOVE-PIPE DAMPER.—R. Moss Breckenridge, West Meriden, Conn.

First, I claim the rod, A, combined and arranged with the damper plate, C, substantially as and for the purposes herein set forth.

Second, The spring handle, B, at the upper part of the rod, A, combined with the rod, A, and damper plate, C, substantially in the manner and for the purpose herein shown and described.

56,892.—BODY CONFORMATORS.—S. O. Brigham, San Francisco, Cal.

I claim an apparatus or implement for the cutting and fitting of ladies' dresses and other garments, which when applied to the person will adjust itself thereto, and is provided with any suitable means for indicating the line or lines of the seams for the garment to be cut, substantially as herein described.

56,893.—Reaping and Mowing Machine.—Robert Brown, Dayton, Ohio.

I claim, First, The combination of a crown wheel, which is adapted for receiving and forming independent bearings for vibrating rake and reel arms, with a cam, F, which is fixed to the post, E, around which said wheels turn, and which is so constructed as to act upon the inner projecting arms of the rake and reels, substantially as described.

Second, Dishing or opening the crown wheel, D2, for the purpose of receiving the cam, F, and allowing of depression of the inner projecting ends of the reel and rake arms, substantially as described.

Third, The construction and combination of the cam, F, and guard, F', for the purposes substantially as described.

Fourth, In a combined reaping and mowing machine, having a rake attachment substantially as described, I claim providing means, substantially as described, for making flexible or rigid the joints at e', substantially as specified.

Fifth, The arrangement of the bending and gathering board, L', directly on the jointed drag bar, L, the said board extending along the whole length (or nearly so) of the drag bar, and serving to assist the rake and reel in getting the grain on and off the platform without interfering with the motion of the platform, substantially as described.

56,894.—Bag Fastener.—William H. Brown, Worcester, Mass. Antedated August 2, 1866.

I claim, first, The combination and arrangement of the segments, A B and C', the lever, D, and link, E, substantially as described.

Second, The method described of securing the clasp against accidental release.

56,895.—Fence.—William H. Brown, Stockwell, Ind.

First, I claim the combination of the blocks, B and C, and inclined corner stakes, D, with the panels, A, when the blocks, stakes, and panels are constructed and arranged substantially as herein described and for the purpose set forth.

Second, The combination of the long poles or rails, E F, and stakes, G, with the panels, A, of the fence, substantially as described and for the purpose set forth.

Third, Combining the lower top rails, E, with the top of the uprights, e2, substantially as described and for the purpose set forth.

56,896.—Composition for Grinding and Polishing.—N. A. Buhle, New York City.

I claim a compound for grinding and polishing, made as herein set forth.

56,897.—Machine for Making Eyelets.—Edwin B. Butler, New Britain, Conn.

First, I claim the employment of the movable die plates, c, having two or more rows of dies, d, substantially as and for the purpose described.

Second, I claim the male and female dies, constructed and operating as described.

Third, I claim the employment of the clearers, q, in combination with the die plates, c, arranged and operating substantially as and for the purpose described.

Fourth, I claim the employment of the slide plate, n, and pawl, n', in combination with the steps or pins, e, and die plates, c, substantially as and for the purpose described.

Fifth, I claim in combination with the male and female dies the clearer, h', substantially as described.

56,898.—Method of Operating Steam Engines.—Samuel G. Cabell, Quincy, Ill.

First, I claim providing for the use of a portion of the spent steam in the cylinder, to fill the vacuum on the opposite side of the piston, previously to the admission of fresh steam for its return motion, by means substantially as herein specified.

Second, The arrangement of a valve or valves in the piston of a steam engine, substantially as and for the purpose set forth.

56,899.—Piston for Steam Engine.—S. G. Cabell, Quincy, Ill.

I claim the combination of the flexible disks, D, with a steam or other piston, operating substantially as herein specified.

56,900.—Horse Netting.—J. Cantner and Michael Ulrich, Millheim, Pa.

We claim connecting the lashes, B B, with the straps, A A, by means of looping through single holes, a, and holding them by locking lashes or cords, c, substantially as and for the purpose herein specified.

We also claim the metallic clasps, D D, in combination with the lashes, B B, substantially as and for the purpose herein set forth.

56,901.—Wheel.—Joseph Carlin, Cincinnati, Ohio.

I claim the arrangement of hub, A, having the described concave or dished periphery, C C', and central collar, B, which supports on their inner sides two sets of straddling spokes, F F', substantially as and for the purpose set forth.

56,902.—Needle-Feed Sewing Machine.—Wm. H. Cately, New York City.

First, I claim the combination of the mechanism for operating the needle, and varying the extent of the feed with the mechanism for operating the looper, the same being constructed, arranged, and operating substantially as described.

Second, The arrangement of the looper slide, J, so as to be operated directly by the crank pin of the shaft, G, in combination with the arrangement of the needle, so as to be operated directly by the crank pin of the shaft, C, substantially as described.

Third, The construction and arrangement of the plate, K, looper, J', and spring, S, in combination with a needle, which is hung upon a crank pin, substantially as described.

56,903.—Writing and Drawing Card.—Henry A. Clark, Boston, Mass., and Henry J. Griswold, Norwich, Conn. Antedated Aug. 1, 1866.

What we claim is a card or tablet, first printed upon, and the printing or surface covered with a transparent waterproof composition, so that the surface will receive pencil or ink marks which can be rubbed or washed off without defacing the printed matter, lesson or design, substantially as described.

56,904.—Butter Tongs.—J. S. Clark, Auburn, Mass.

First, I claim the combination of the parts marked A B C and D, constructed and arranged in relation to each other, substantially as and for the purposes set forth.

Second, In combination with the plates or pads, D, of the butter tongs, as described, I claim the indentations or ridges, c, formed in or upon said plates, as and for the purposes set forth.

56,905.—Tube Thimble.—Charles W. Copeland, New York City.

I claim the construction of the calorimeter thimble, substantially as herein shown and described, so as to govern the calorimeter and reduce the draught without obstructing the lower part of the tube, as set forth.

56,906.—Machinery for Unloading Railroad Cars.—John Dable, Chicago, Ill.

First, I claim the horizontally vibrating arm, d, constructed with a loop, d', crosshead, d2, and provided with a pulley, c2, and anti-friction rollers, in combination with the bridge bearing, d3, all operating substantially as described, for laying the rope evenly upon the drum, c1.

Second, The construction and manner of application of the E E, in connection with the machine herein described for unloading railroad cars, and other receptacles, of their contents, substantially as set forth.

Third, The combination and arrangement of the swivel coupling, c c', drum c1, rope, b, and hinged frame, G, substantially in the manner and for the purpose described.

Fourth, The combination and arrangement of the spring friction device, J, drum, c1, rope, b, and hinged frame, G, substantially in the manner and for the purpose described.

Fifth, The combination and arrangement of the V form spring stop, b2, clutch lever, D, connecting rod, D2, lever, D1, drum, c1, and rope, b b1, substantially as and for the purpose described.

Sixth, Connecting the frame or "shears," G, to the sill, A1, by means of a rod, g, and providing at the same time for adjusting said frame laterally, and establishing it at any desired point, substantially as described.

Seventh, The combination of the convex ends, w w, of the pulleys, h h, with the convex surfaces of the plates or jaws, j j, of the hinged frame, G, substantially as and for the purpose described.

Eighth, The combination with the drum c1, friction brake, J, clutch lever, D, spring stop, b2, connecting rod, D2, lever, D1, rope, b b1, and hinged frame, G, substantially as and for the purpose described.

56,907.—Propeller Screw.—Wm. Edward Davis, Jersey City, N. J.

First, I claim the propeller screw blades, A A, cut out of flat metal plates, and bent up to shape, substantially as herein described.

Second, I claim the mode of connecting and fastening the separate screw blades upon the shaft of a propeller, in the manner and for the purposes substantially as herein described.

56,908. — Governor.—John Degnon, Cleveland, Ohio.

I claim the combination of the propeller, B, revolving in water, in the cylinder, A, the spindle, C, and rack, D, applied with the toothed segment, E, attached to the spindle, d, operated through the medium of the gearing, a b, substantially in the manner and for the purpose represented and described.

56,909.—Stop Device for Sewing Machine.—Albert S. Dewey, Westfield, Mass.

I claim the spring, D, applied to shaft, B, either with or without the hubbed pulley, A E, substantially as shown and used, all arranged to operate in the manner substantially as and for the purpose set forth.

56,910.—Washing Machine.—Wm. M. Doty, E. P. Doty and Ellis Doty, Janesville, Wis.

First, We claim the combination of the spiral springs, c d, fulcrum pins, b, and oscillating washboard, B, constructed as described, and operating substantially as and for the purpose specified.

Second, In combination with the above, I claim the projecting cheek pieces, C, with chamfered edges, constructed and operating substantially as and for the purpose described.

Third, The cleats, F, fastened to the ends of the tub, and provided with sockets to receive the upper ends of the legs, E, which are fastened to the lower edges of the ends of the tub with screws or bolts, substantially as and for the purpose set forth.

56,911.—Washing Machine.—Amos Durant and Henry Gressirn, Stockton, Cal.

We claim the application and combination of the levers, c c and D D, working from different centers, and connected with the plunger, E, and worked by reciprocating motion, as herein set forth.

56,912.—Fanning Mill.—Charles K. Ehle, Greenbush, Wis.

First, I claim constructing the drum with its front side extended upward, and its top extended forward and upward, so as to form a throat through which the wind is discharged immediately beneath the hopper and above the screens, substantially as described and for the purpose set forth.

Second, The combination of the cross bar, I, and perforated screen board, J, with each other, and with the shoe, G, of the mill, substantially as described and for the purpose set forth.

Third, The combination and arrangement of the sieve, P, trough, R, and discharging spout, with each other, with the shoe, G, and with the side, O, of the mill, substantially as described and for the purpose set forth.

Fourth, The combination of the seives, K L, trough, M, and spout, N, with each other, with the shoe, G, and with the side, O, of the mill, substantially as described and for the purpose set forth.

Fifth, The combination of the inclined board, S, trough, T, and spout, U, with each other, with the shoe, G, and with the side, O, of the mill, substantially as described and for the purpose set forth.

56,913.—Picker Motion for Power Looms.—Hosea Elliott, Globe Village, Mass.

First, I claim, in combination with the loose crank, N, sweep, N, the lever, R, and the spring, P, for giving motion to the picker-staff, substantially as described.

Second, I also claim operating the picker staff of a loom by means of the appliances that act independently of the driving shaft, substantially as described.

Third, I also claim, in combination, the cam, U, the arm, G, and the cord, F, for drawing the picker staff inward, substantially as described.

56,914.—Mode of Tinting Photographs, etc.—Charles Elveena, San Francisco, Cal.

I claim the mode herein specified of tinting surfaces for use in the arts, by the action of smoke or fumes within a closed chamber, as specified.

56,915.—Safety Cage for Mines.—John Evans, Virginia City, Nevada.

I claim the employment or use of the lever, A, spring bar, B, with the friction roller, e, and guide pin, d (or their equivalents), when arranged substantially as described and for the purpose set forth.

56,916.—Apparatus for Tempering Chisels.—William M. Everitt, Malden, N. Y.

I claim the combination of the table, B, and rack, D, with the tub or water bath, A, for the purposes hereinbefore set forth.

56,917.—Fishing Apparatus.—P. H. Ferl and W. Larkins, Detroit, Mich.

First, We claim a net of the form and construction herein substantially described.

Second, The construction and combination of the tube, A, the arms, F, the bolts, M, with the springs, ropes, and pulleys, substantially as herein described.

Third, The combination of the tube, A, the arms, F, the bolts, M, and the springs, ropes, and pulleys, substantially as herein described, with the net for the purpose of spreading, casting, and sinking the same, substantially as described and for the purpose hereinbefore set forth.

56,918.—Churn.—Wesley S. Ferrier, Indiana, Pa.

I claim the combination and arrangement of the dashers or beaters, B B, shafts, c c', with the shafts F F', and gear wheels, G G, gear wheels, H, all for the purposes and substantially as herein described.

56,919.—Pipe Welding Furnace.—Joseph Fieldhouse, Taunton, Mass.

I claim the arrangement of the fuel supply throats, c c c c, of the welding heat chamber in the partition, G, which separates it from the oven, and with respect to the fuel supply throats, D D D D, of the fire place of the oven, substantially in manner as specified.

I also claim the combination and arrangement of the series of bridges, C C C, with the oven and its fire piece, the welding heat chamber and the two series of fuel supply throats, c c c c, D D D D, arranged in the side wall of the oven fire place and in the partition wall, G, substantially as specified.

56,920.—Pen and Pen-holder.—G. T. Foster, Jersey City, N. J.

I claim a single or double pointed pen connected with the holder by a swivel joint constructed as and for the purposes set forth.

I also claim in combination with the above, the offsets in the case, substantially as and for the purpose specified.

56,921.—Boots and Shoes.—Samuel T. Fowler, Brooklyn, N. Y. Antedated July 27, 1866.

I claim securing to the soles of boots and shoes, india-rubber soles by means of screws, the washers upon said screws being expanded into guards, as shown in the drawing and described herein.

56,922.—Spinning Mule and Jack.—John Goulding, Worcester, Mass.

First, The combination in a spinning machine of the following instrumentalities, viz, the carriage and jaws for the wings, and the stationary turning spool support, substantially as set forth.

Second, The combination in a spinning machine of the following instrumentalities, viz, the stationary jaws, stationary turning spool support, traveling jaws and carriage, substantially as set forth.

Third, The combination in a spinning machine of the following instrumentalities, viz, the traveling carriage, the shaft thereof, and ropes for turning the said shaft, substantially as set forth.

Fourth, The combination in a spinning machine of the following instrumentalities, viz, the drum for imparting motion to the spindles, pulleys, endless rope, tightening pulley, and adjustable weight, substantially as set forth.

Fifth, The combination in a spinning machine of the following instrumentalities, viz, the drum for imparting motion to the spindles, pulleys, endless rope, tightening pulley, adjustable weight and second tightening pulley, substantially as set forth.

Sixth, The combination in a spinning machine of the following instrumentalities, viz, the regulating wire, friction brake, and drum for imparting motion to the spindles, substantially as set forth.

Seventh, The combination in a spinning machine of the following instrumentalities, viz, the drum for imparting motion to the spindles, pulleys, endless belt, tightening pulley, and cams, substantially as set forth.

Eighth, The combination in a spinning machine of the following instrumentalities, viz, the drum for imparting motion to the spindles, friction brake and cam, substantially as set forth.

Ninth, The combination in a spinning machine of the following instrumentalities, viz, the arm of the backing-off mechanism, shifting screw and section nut, substantially as set forth.

56,923.—Bridle Bit.—F. N. Frost, New Britain, Conn.

I claim a bit for horses or other animals, made of a closely coiled or spirally wound metallic wire, substantially as described.

In combination with the above, the use of a chain or its equivalent as and for the purpose specified.

56,924.—Hay Loader.—Austin Fuller, Plymouth, Ind.

I claim the hereinbefore described arrangement of a hay loader consisting of a derrick, C, mounted upon the center of one side of the rack, and sustained by the transverse timbers, B and B' so as to turn freely in all directions and by a guy, I, attached to a post, D, upon the opposite end of the timbers and restrained from turning by another guy, H, substantially as described.

56,925.—Loom.—A. P. Garretson, Ripley, Ohio, and J. M. Hoffman, Miami, Ind.

We claim, First, The endless belt, C, and picker, A, with the hooks, H, and side binders, G, fastened in the breast beam, B, and the pin, K, in the lathe, J, all arranged as described for the purpose of vibrating the shuttle.

Second, The shedders, M, with their projections, N, and elevators, P, passing through them, with the arms, Q, and resoting pulley, T, on the cam shaft, R, when arranged and combined as herein described and for the purpose set forth.

Third, We also claim the square block, W, on the shaft, R, with the falling block, X, when operated by the lathe as herein described.

56,926.—Clothes Drier.—Stephen L. George, Decatur, Mich.

I claim the arrangement and combination of the crank pulley, C, tightening pulley, K, grooved pulleys, D D, with the posts, B B, constructed and operated as herein described and for the purpose set forth.

56,927.—Hydrant.—Napoleon B. Gousha, Baltimore, Md.

I claim, First, The perforated hollow screw valve, D, in connection with the flange, c, leather washer, f, as constructed and arranged in combination with the chamber, B, neck, a, and supply pipe, C, substantially in the manner and for the purpose herein set forth.

Second, The combination of the perforated hollow screw valve, D, with the wrench rod, F, and cap or valve, e, substantially in the manner and for the purpose as set forth.

56,928.—Scissors.—W. W. Grier and R. H. Boyd, Halton, Pa.

We claim providing shears or scissors with the ripping hook, a, substantially as and for the purpose set forth.

56,929.—Head Block for Saw Mills.—J. A. Griggs, Charleston, Ill.

I claim the setting of logs to circular saws by means of a bar or handle passing over the log and saw, to within convenient reach of the sawyer, and connected by a toggle and rock shaft to pawls which engage with racks on the head blocks, substantially as herein shown and described.

56,930.—Traveling-Bag Frame.—Nicholas Groel Newark, N. J.

I claim the angular encasing metallic band, D, made as described, for strengthening the hinged portions of a traveling-bag frame, substantially as and for the purpose specified.

56,931.—Show Case.—Joel Haines, West Middleburg, Ohio.

I claim the revolving shelves and rack or frame constructed and arranged substantially as described for the purpose set forth.

56,932.—Washing Machine.—C. H. Hale, Fayetteville, N. Y.

I claim the arrangement of the perforated and ribbed washboard, and covered rollers, E, in combination with the adjustable springs, K, as herein described, and for the purposes set forth.

56,933.—Key Fastener.—Marshal P. Hall, Manchester, N. H.

I claim the devices herein described, that is to say the notched piece, a, or its equivalent, entering the key hole at one point, and secured to the key at another point by the clamp, c, the washer, w, and the nut, n, or their equivalents.

56,934.—Fruit Jar.—B. J. Harris, Harrisburg, Pa.

I claim the open mouthed can, A, provided with corrugations and groove arranged and used with the cross bar, B, and top, C, substantially in the manner and for the purpose herein specified.

56,935.—Perpetual Calendar.—Horace Harris, Newark, N. J. Antedated July 25, 1866.

I claim the table, B, arranged to slide by the days, C, substantially in the manner and for the purpose set forth.

56,936.—Horse Hay Fork.—Samuel Harris and D. Harris, Shippenburg, Pa.

We claim the two pairs of bars, a a, pivoted at their upper ends to a cross bar, c, in combination with the levers, B B', and forks, C C, connected or applied to the bars, a a, as shown and provided at their upper ends with the hook, f, and slotted bar, E, or other equivalent fastening to connect the rod, A, with the levers, B B', all arranged substantially as and for the purpose set forth.

56,937.—Fishing-Line Reel.—A. B. Hartell, New York City.

I claim the screw, a, in combination with the fixed stud, b, of the reel, substantially as and for the purpose specified.

56,938.—Leather-Chamfering Machine.—C. H. Helms, Poughkeepsie, N. Y.

First, I claim the cutter wheel having a projecting rim with a beveled face in combination with a cutter arranged in the said rim, substantially as hereinbefore set forth, for the purpose of chamfering or scarfing pieces of leather.

Second, I also claim the combination of a standard composed of two parts, substantially as hereinbefore set forth, with a guide-plate, for the purposes as hereinbefore described.

Third, I also claim the method of clamping or holding the piece of leather at its back side, and back of the edge of the cutter, substantially as hereinbefore described, in combination with the cutter wheel and guide plate, for the purposes hereinbefore set forth.

56,939.—MAGAZINE FIRE-ARM.—Hiram W. Hayden, Waterbury, Conn. Antedated Aug. 3, 1866.

First, I claim the block, e, formed as a T head to the shank, e', and both occupying grooves in the breech pin, d, in combination with the housing, e e', having notches for the reception of the ends of block, e, at each side of the breech pin, as and for the purposes specified.

Second, I claim the cross block upon a shank passing into a groove in the breech pin, in combination with a spring to throw said block down into place as the breech is closed, as set forth.

Third, I claim the slide exploding punch fitted as specified, and actuated by forcing the said cross block down to its place as set forth.

Fourth, I claim constructing the hammer with the latch and groove taking the pin on the said cross block, as and for the purposes specified.

Fifth, I claim the combination of the hammer, the cross block, the breech pin and the spring, n, as specified, whereby the said hammer lifts the said cross block, and draws back the breech pin in the act of cocking the piece, and the breech closes itself, as set forth.

Sixth, I claim the combination of the breech pin and sliding cartridge conveyor with the lever, t, actuated substantially as and for the purposes specified.

56,940.—SCALE.—Charles E. Hoffman, Jersey City, N. J.

First, I claim making the knife edges, H' J', adjustable in slots, or their equivalents, in the levers, C' and G, and arranged to operate relatively to said levers and their connections, substantially as and for the purpose specified.

Second, I claim making the lever, G, in a single bar, with openings to receive the links, I' I'', and to support them centrally therein, by which arrangement I construct the scale at less expense and with less liability of derangement.

Third, I claim receiving the post, M', within openings in the levers, C' and G, so that these parts shall mutually steady and support each other, substantially as herein specified.

Fourth, I claim the rigid posts, e1 e2, and straight knife edges, g1 g2, in contradistinction to flexible links, and hollowed or notched knife or edges, and arranged to operate substantially in the manner and with the advantages herein specified.

56,941.—MACHINE FOR HOLDING AND FILING DOCUMENTS.—Marcus L. M. Hussey, New York City.

I claim an improved letter file, having a removable or sliding door, E, which may be used as such door and also as a paper folder or cutter.

56,942.—GANG PLOW.—Samuel Hutchinson, Griggsville, Ill.

First, The elevating or adjusting of the frame, A, of the machine in a vertical direction in order to regulate the depth of the penetration of the plows, by means of levers, H H, provided with lower segment ends, a, and secured to the sides of frame, A, in combination with the pendent pins, E E, attached to frame, A, and passing loosely through the axle, D, substantially as shown and described.

Second, The plow frame, I, fitted within the frame, A, and connected by a chain, O, with a plate, N, attached to a shaft, L, over frame, I, whereby the plow frame and plows may be raised when desired, and the plows when at work retained in the ground, substantially as set forth.

56,943.—SLIDING SLATE FOR COMPUTATION CARDS.—George N. Jackson, Chicago, Ill.

I claim the combination with the tabular card of a computing slate arranged to slide therefrom, substantially as set forth.

56,944.—CONVERTIBLE STEREOSCOPE.—William H. Jacoby, Xenia, Ohio.

First, I claim the eye piece, A A' B D D', formed for separate use, or in combination with a stereoscopic case, substantially as set forth.

Second, The arrangement of eye-piece, A A' B D D, lips, E F, chamber, G, and spring H, for the purpose explained.

Third, In the described combination with the elements of claim second, I claim the receptacle, I I' J J', substantially as set forth.

56,945.—DENTISTS' VULCANIZER.—Charles H. James, Cincinnati, Ohio.

I claim the yoke, F F' f, central set screw, G, and notched flange, B b, arranged and operating substantially as and for the purpose specified.

56,946.—STEAM-ENGINE VALVE.—Andrew Jamison, Taylorstown, Pa.

I claim the saddle-shaped valve, C, and its seats, B and D, made of corresponding shape thereto, when arranged together, substantially in the manner and so as to operate as and for the purposes specified.

56,947.—HOISTING APPARATUS.—Barton H. Jenks, Bridesburgh, Pa.

First, I claim providing for raising or lowering a carriage which is mounted upon an inclined track or perpendicular shaft by means of ropes or chains, and at the same time, to so construct the devices which act upon and move the wheels of said carriage, that should the hoisting rope or chain break, the carriage will remain in a steady and safe position upon the track, substantially as described.

Second, The means, substantially as herein described, for holding the upper end of the carriage down upon the inclined track, and preventing lateral displacement.

56,948.—DREDGING MACHINE.—John Johnson, Saco, Maine.

I claim the system or mode of dredging, consisting of an air-tight, flexible supply tube, an air-tight floating barge or vessel, and suitable pumps for removing air water from the vessel, substantially as herein described.

I also claim, in combination with an air-tight floating barge, the discharge valve, V, and the bulk heads, that allow the water to flow over them into the pump well, as it is displaced by the entrance of sand, or other dredged material.

I also claim the cross-tube, K L, in combination with the main supply tube, as specified.

I also claim the combination of the cross-tube, K L, with its bearings, I I', for the purpose of raising and lowering the tube without disturbing the position of the orifice through which the mud or sand passes.

I also claim the combination of the cross-tube with the cap or stopper, C, so fitted that it can be taken off for the purpose of removing obstructions, substantially as herein set forth.

56,949.—AERO-GAS BURNER.—Wm. Jones and M. H. Collins, Chelsea, Mass.

We claim the improved aero-gas burner, that is, one made with or having a means of closing, and more or less opening its air inlet or inlets, as specified.

We also claim the combination of the removable deflecting dome or cap, C, made with eduction orifices in it and near its base or lower part, with the aero-gas burner, as specified.

We also claim the peculiar mode, as described, in which to construct the aero-gas burner, viz: by uniting its two parts, A B, by screws, a b, and arranging the air-inlet holes of upper part, A, with respect to such screws, in manner as specified.

56,950.—WASHING MACHINE.—Albert Joyner, Elton, Wis.

I claim the manner, substantially as shown, of keeping the journals on which the rubbing concave is suspended in their bearings.

56,951.—SNAP HOOK.—Oliver S. Judd, New Britain, Conn.

I claim securing one end of the spring, g, in the heel of the shank of the hook or latch, while the other end bears against the opposite side of the chamber, and thereby produce a pulling motion, substantially as and for the purpose described.

56,952.—LAMP CHIMNEY.—Anson Judson, Brooklyn, N. Y.

I claim constructing a lamp chimney in the form hereinbefore set forth, to prevent the fracture of the chimney by the unequal exposure to heat to which other forms are subject.

56,953.—BROOM HEAD.—J. W. Keene and W. E. Snediker, Utica, N. Y.

First, We claim the extension rod, F, in combination with the links, L L, and the straps, M M M M, or their equivalents, constructed and operating substantially as described.

Second, The head, A, in combination with the arms, G G, or their equivalents, constructed and operating substantially as described.

Third, The slotted ferrule, C, the nut, E, and the cap, D, in combination, substantially as described, and for the uses and purposes mentioned.

56,954.—MACHINE FOR MAKING FORKS.—Horace B. Kinney, Leonardsville, N. Y.

I claim, First, Spreading and swaging the split blanks of two or many-tined forks by means of a die block and supports, constructed and operating substantially as described.

Third, The adjustable yoke-support, k, or its equivalent, in combination with a wedge-shaped reciprocating spreading die, substantially as described.

Third, Straightening the tang and the tines of a fork blank during the act of forming the shoulders, against and between supports, constructed and arranged substantially as described.

Fourth, The movable shoulder plates, g g, in combination with back supports, N, and a reciprocating die or dies, H, substantially as described.

Fifth, The yoke, KS, with shoulders on it, in combination with a reciprocating shaping die, H3, or its equivalent, for shaping the forks after their tines have been drawn out under the hammer, substantially as described.

Sixth, The combination of splitting shears, J, with a fork bending and swaging machine, constructed substantially as described, said shears being actuated by the driving shaft of the swaging dies, substantially as described.

Seventh, The gages, S S', to support the fork blanks in proper position, during the operation of the shears in splitting these blanks, constructed and arranged substantially as described.

Eighth, The dies, constructed and arranged substantially as described, for making rounded or square shoulders at the junction of the tines of the fork blank with the tang or head, as set forth.

Ninth, The guide blocks, P P, in combination with adjustable shoulder plates, g g, or their equivalents, supported substantially as described, and reciprocating dies, H H, the guides, P P, closing the dies, H H, in their forward movement toward plates, g g, substantially as described.

56,955.—WASHING MACHINE.—Adolph F. Kuhlmann, Glenhaven, Wis.

I claim, First, The soap roller, K, in combination with the feed board, h, and oscillating shaft, c, constructed and operating substantially as and for the purposes described.

Second, The feed rollers, g g, in combination with the oscillating rubbers, E, wash-board, e, soap roller, k, and feed board, h, constructed and operating substantially as and for the purpose set forth.

56,956.—STEAM-ENGINE GOVERNOR.—T. S. La France, Elmira, N. Y.

I claim, First, A governor for a steam engine, having balls, G, supported upon the vertical arms of nut levers, E, which with the divergence of the balls, when in action, raise the weight, D, and actuate the valve rod, substantially in the manner set forth.

Second, I claim, in the mechanism of such a governor, the arms, C, attached to the spindle, B, and forming the fulcrum for the nut levers, E, substantially as set forth.

Third, Arranging the balls, G, upon the vertical arms of the nut levers, E, so as to regulate their action by altering their distance from the fulcrum, substantially as set forth.

Fourth, In combination with the flange, D', and lever, E, I claim the friction roller, F, the said parts being arranged substantially as and for the purpose set forth.

Fifth, In combination with the ball, D, and balls, G, I claim the spiral spring, I, substantially as and for the purpose set forth.

56,957.—STEP LADDER.—John S. Lash, Philadelphia, Pa.

I claim, First, The combination of the eye plates, c, socket plates, d, extension braces, F F, and hinged center bar, G, the whole constructed and operating substantially as and for the purpose set forth.

Second, Providing the top step, C, of a step ladder, with a hinged leaf, C', substantially as described.

56,958.—CENTER CHILL FOR CAR WHEEL.—John W. Latcher, Albany, N. Y. Antedated July 24, 1866.

I claim the employment of the metallic center chill or core, C C', constructed and held, substantially as shown and described, in combination with the periphery chill, as set forth.

56,959.—WASHING COMPOUND.—W. Leonard and J. J. Johnston, Allegheny City, Pa.

We claim the compound herein described, compounded of the ingredients named, and in the quantities specified, said ingredients being manipulated and treated in the manner and for the purpose herein described and set forth.

56,960.—HORSE RAKE.—P. Lugenbell and T. Barns, Greensburg, Ind.

We claim, First, A horse rake for gathering hay, etc., when constructed with wheels, C C, and a revolving axle, D, and two or more rows of teeth, E E, attached thereto, and having, also, reciprocating bars, I I, corresponding in number with the rows of teeth for checking the revolution of the axle and teeth, as they are successively brought into action, substantially as set forth.

Second, In combination with the bars, I, attached to the axle, we claim the springs, M, attached to the wheel and guides, k, with the flange, K', for alternately checking and permitting the revolution of the axle and teeth, substantially in the manner set forth.

Third, In combination with the bars, I, we claim the lever, F, and bell crank, H, arranged substantially in the manner and for the purpose set forth.

56,961.—GRAB TOOL FOR OIL WELLS.—J. H. Luther, Petroleum Center, Pa.

I claim the grab herein described, the same consisting of the hollow cylinder or tube, A, provided with grab jaws, B, connected to a common collar, D, and spiral spring, or its equivalent, when all constructed and connected together, substantially as described and for the purpose specified.

56,962.—FLOOD GATE.—Jeremiah Macby, Portage, Wis.

I claim the tilting gate, c, pivoted so that the pressure of the water thereon shall cause it to open and close in the manner substantially as herein shown and described.

56,963.—WAGON.—Charles S. Martin, Milwaukee, Wis.

First, In combination with the bars, G, having shoulders resting upon the plates, S, and the plates, S, I claim the tapering india-rubber spring, E, substantially as and for the purpose set forth.

Second, I claim constructing the hind bolsters of a wagon with a recess, E', for the purpose of receiving an india-rubber spring, and with or without the strengthening plates and bands, M, substantially as set forth.

Third, I claim the double cups, I, and the caps, K, in combination with the india-rubber springs, in the form of frusta of cones or pyramids, the several parts being constructed and arranged for use, substantially in the manner and for the purpose set forth.

Fourth, In combination with projections upon the bolster plate, P, I claim a corresponding depression upon the top of the plate, covering the caps, K, substantially as and for the purpose set forth.

56,964.—COFFEE ROASTER.—H. B. Masser, Sunbury, Pa.

I claim a coffee roaster, composed of a wire cloth receptacle, with a flange fitted upon it, and provided with a stirrer and handle, substantially as shown and described.

56,965.—SAWING MACHINE.—James D. Matthews, Bowling Green, Ohio.

I claim the saw blades, hung to a common holder in such a manner as to open from and close upon each other, in combination with a frame, A, or its equivalent, to receive the said saw-blade holder, when arranged together, and operating substantially in the manner and for the purpose described.

56,966.—BELT COUPLING.—James Mattix, Kokomo, Ind.

I claim the hereinabove described device for adjusting the length of belt couplings without removing the clasps, B B, by the insertion of a three-sided link, d', the ends of which are riveted by a yoke, E, attached to the screws, F, substantially in the manner set forth.

56,967.—EYE GLASS.—Edward Maynard, Tarrytown, N. Y.

I claim a stay or nose piece in combination with the frame of eye glasses, substantially in the manner and for the purpose herein set forth.

56,968.—HORSE RAKE.—William McCord, Sing Sing, N. Y.

I claim, First, Setting upon the four supports, D and E, an adjustable frame, A, upon which the whiffletree is placed, in the manner and for the purpose above described.

Second, The gathering fingers, C, to aid in depositing the hay in a compact row, in the manner described.

56,969.—CORN PLANTER.—O. C. McCune, Darby Creek, Ohio.

I claim the combination of the lever, Q, toothed segment, P, pinion, O, wheel, N, slides, K, and valves, e, all arranged as and for the purposes set forth.

56,970.—MACHINE FOR MARKING GROUND FOR PLANTING.—Preston W. McQuaid, Wenona, Ill.

I claim the frame, A, with draught hole, B, attached and having two marking wheels, C C, fitted within it on axles working in fixed bearings, in combination with the adjustable or rising and falling wheel, D, fitted within the frame, A, and connected with the driver's seat, F, substantially in the manner as and for the the purpose herein set forth.

56,971.—PROCESS FOR THE REDUCTION OF FIBROUS SUBSTANCES TO A PULP.—Harrison B. Meech, Fort Edward, N. Y.

I claim, First, Reducing fibrous substances to a pulp by means of chlorine gas under pressure, in combination with an alkaline solution.

Second, The use of chlorine gas under pressure for the purpose of dissolving the glutinous substances during the first process in the preparation of paper stock from wood or other fibrous substances.

Third, Using chlorine gas under presure in dissolving silica in fibrous substances, and then converting said substances into pulp and retaining the silica in the pulp.

Fourth, Reducing fibrous substances to a pulp for the manufacture of manilla paper by means of chlorine gas under pressure, in combination with the solution, herein described.

56,972.—FRUIT GATHERER.—S. Mellinger, Jr., Mount Pleasant, Pa.

I claim the combination of the toothed jaws or frames, A A2, hinged together with a bag or receiver secured to one when the whole is swiveled or pivoted to a suitable handle so as to swing in rightangular planes thereon, substantially as and for the purpose described.

I also claim the trigger and cord, connecting it with the jaws or frame, A2, as and for the purpose specified.

56,973.—PADDLE WHEEL.—James Merkel, Mount Pleasant, Iowa.

I claim the combination of the stationary cam plate, M, antifriction rollers, R R, and radially-reciprocating paddles, with a drum, H G, having the spaces between the paddles fitted and all constructed and arranged to operate substantially as described.

56,974.—LAMP.—Rufus S. Merrill, Boston, Mass.

I claim, First, The combination with a collar fitting over the top of a lamp of a central tube secured to said collar and extending therefrom toward the bottom of the lamp, substantially as and for the purposes herein shown and described.

Second, The combination with a lamp collar provided with a groove, or the equivalent thereof, as herein described, I claim the cylinder or tube having a flange around one end and longitudinal slits or grooves in its sides, the whole being arranged for operation as set forth.

56,975.—STOVEPIPE DAMPER.—Benjamin F. Miller, New York City.

I claim the divided case, f, fitted for the reception of the damper and for setting between the lengths of stove pipe, said case being provided with flanges attached together, as and for the purposes set forth.

56,976.—HARNESS MOTION FOR LOOMS.—Charles Miller, St. Louis, Mo.

I claim the arrangement and application of a set of levers, D1 D2, to produce the loom harness motion, substantially as set forth.

56,977.—AXLE BOX.—M. V. Miller, Manchester, Pa., and George Henry, Steubenville, Ohio.

We claim, First, The plate, P, slots, G, in combination with the springs, F, journal box, B B', and case, A, when arranged as in the manner and for the purpose set forth.

Second, The combination of case, A, journal box, B B', axle or journal (x), springs, F F, stops, G, and plate, H, constructed and arranged substantially as shown and described and for the purpose set forth.

56,978.—APPARATUS FOR COOLING LIQUORS.—T. H. Miller, Allentown, Pa.

I claim the metallic-lined box, A, provided with the lid, D, with rubber stripe, g, and tubes, C, to allow the bottles to be placed, forming a receptacle between each tube for the ice, F, the whole being arranged as and for the purposes herein set forth.

56,979.—HEATING STOVES.—G. Moody and W. P. Hall, Piqua, Ohio.

We claim, First, The lower hot-air chamber, E, in combination with the upper hot-air chamber or oven, H, with a flue and air passage for conducting heated air from the lower to the upper chamber, substantially as shown and described.

Second, In combination with the hot-air chamber, N', and the perforations, n, we claim the hinged adjustable grate with the ball or pawl, l, and the ratchet, l', substantially as shown and described.

Third, In combination with the lower chamber, E, and the upper chamber, H, with flue, and air passages communicating between them, as described, we claim the movable plate, G', as and for the purpose described.

Fourth, In combination with the flue, w', and throat, t, we claim the damper, I, to perform the double function of a damper and scraper, substantially as described.

56,980.—WRENCH FOR NUTS OF CARRIAGE AXLES.—Charles N. Morgan, Granby, Mass.

I claim the device for attaching the nut to the wheel, consisting of jaws, c c, screws, D, and plate, E, provided with the socket, G, the whole combined and arranged in the manner and for the purpose herein described.

56,981.—CHUCK.—Rufus W. Morse, East Berlin, Conn.

I claim the combination of the case, g, sliding jaws, c, with the stocks, a a', substantially as and for the purpose described.

56,982.—FRUIT DRIER.—G. R. Nebinger, Lewisberry, Pa.

I claim, First, A dry-house for fruit, having the side walls made double, with an interior opening at the top, and an adjustable exterior opening at the bottom, as shown in Fig. 1, in combination with the hollow rear wall, D, having the air passages and valve, M, arranged as shown in Fig. 2.

Second, I claim arranging the racks, c, so as to form the passages for the hot air at the opposite ends alternately, for the pur-

pose of causing it to pass both over and under all the racks, as set forth.

Third, In combination with the rack, e, arranged as shown and described, I claim the furnace, B, with the inclined shield, C, when constructed and arranged to operate substantially as set forth.

Fourth, I claim the extension of the smoke pipe, F, within the furnace, B, as and for the purpose set forth.

56,983.—Artificial Leg.—Robert H. Nicholas, Chicago, Ill.

First, I claim the combination of the jointed connection, C D, the cushion, G, and spring, E, arranged and operating in the manner and for the purposes specified and shown.

Second, I claim the combination of the cushion, G, spring, E, jointed rod, C D, and the springs, H J, arranged and operating as and for the purposes set forth.

Third, I claim in combination with a jointed connection, C D, allowing a free movement of the foot, the arrangement of the two cords, F, and springs, S, operating substantially as and for the purposes described.

Fourth, I claim the combination and arrangement of the connection, C D, cushion, G, springs, E, cords, F, and springs, S, operating substantially as set forth for the purposes specified.

Fifth, I claim the recess, L, in the lower part of the leg, when extending around upon the sides thereof, as described, in combination with the heel, L, constructed with a corresponding projection extending around upon the sides of the foot, arranged and operating as specified and for the purposes set forth.

56,984.—Dredging Machine.—W. H. Nobles, St. Paul, Minn.

I claim, First, The construction of the adjustable stanchions, E, attached to a boat, as herein described and for the purposes set forth.

Second, I claim the arrangement and combination of the chain, G, pulleys and grappling irons, K, when arranged and combined with the revolving plows, B, as herein described and for the purposes set forth.

56,985.—Fence.—Eli Odell, Winterset, Iowa.

I claim, First, Pivoting the rails, F, or bars, U, to the cleats, Q, or pickets, P, in such a manner as to adapt the pannels to the irregularities of the ground, as described, in combination with the notches, M N, for locking the panels together, as specified.

Second, The hooks, M N, for coupling the panels in combination with the self-sustaining brace-posts and pivoted rails, made and operating as described.

Third, The transverse brace and supporter, consisting of the long braces, E E, the collar beam, H, the short braces, F F, and the spur posts, G G, or their equivalents, as described.

Fourth, The manner of locking and securing the corners as shown, at R R R and S S S, in connection with prolonging the boards to supply the want of a collar beam, as shown at J.

56,986.—Joint for Frames and Legs of Tables.—Solomon Oppenheimer, Peru, Ind.

I claim a metal clamp for joining the frame and legs of a table, having a socket, A, for receiving the legs and wings, B, with claws, a, for receiving the rails, C, and also lips, b, or equivalent devices, for attaching the top of the table substantially as set forth.

56,987.—Automatic Gate.—John G. Page, Rockford, Ill.

First, I claim in combination with the vertically reciprocating gate, A, the employment of the levers, D, and arms, E, arranged and operating substantially as and for the purposes herein set forth and described.

Second, In combination with the above, I claim the levers, G, and arms, E, arranged substantially as and for the purpose specified.

Third, I claim in combination with the levers, D, weighted upon their short arms as described, the employment of the springs, a a, or their equivalent, arranged substantially as set forth.

56,988.—Electro-chemical Telegraph.—Austin Ford Park, Troy, N. Y.

I claim the recording of telegraphic signs by electro-chemical action, in a chemically prepared wet or moist line or path made in a strip or fillet of paper, as the latter is moved along to receive the telegraphic signs, substantially as herein set forth.

56,989.—Obtaining Oil from Wells.—L. Phleger, Philadelphia, Pa., and George G. Lobdell, Wilmington, Del. Antedated Aug. 2, 1866.

We claim inducing the flow of oil from a well by melting the paraffin by the application of heat from hot water, conveyed in a circuit through a pipe, substantially as shown and described.

56,990.—Sewing Machine.—D. B. Piper, Winchendon, Mass.

I claim the combination of the elastic connection, substantially as described (consisting of the yoke, D, the rod, E, and the spring, F, or their equivalents), with the crank or crank wheel, G, of the looper shaft, and with the cam, H, applied to the cam shaft, as described.

56,991.—Molasses Pitcher.—Martin Robbins, Cincinnati, Ohio.

First, I claim the pitcher, provided with a perforated handle, to which is attached a rubber bulb, for the purposes and substantially as described.

Second, I claim the spout, B, when extending nearly to the bottom of the pitcher, in combination with the handle, C, and bulb, F, substantially as described.

56,992.—Boot Heel.—C. Robinson and J. C. Marshall, Springfield, Mass.

We claim the combination of the india-rubber strip, C, with the shell, A, and movable bottom, B, arranged so that the edges of the said bottom press against and are supported by the strip, and is covered with or composed in part of leather, substantially as and for the purpose herein specified.

56,993.—Trunk Engine.—John B. Root, New York City.

I claim the arrangement of the extended trunk, G, connecting rod, K, cross head or connection, J, and guide, L, in relation with each other, and with the cylinder, piston, and crank shaft, substantially as herein described for the purpose set forth.

56,994.—Mosquito Bar.—E. A. G. Roulstone, Roxbury, Mass.

I claim a mosquito bar for windows when constructed with a spring, o or n, applied to one or both sides thereof to hold the bar in position with relation to the sash above or below it, in combination with projecting edges or flanges to fit against the window beads, e or m, all substantially as set forth.

I also claim, in combination with a bar made with these projecting edges and springs, as set forth, so applying one of the springs, n or o', that it may be operated from within the bar, to insert or remove the bar, substantially as set forth.

I also claim, in combination with a bar so constructed with springs, o or, and with a window sash, the employment of the vertical rods, f, for the better securement of the bar, and to enable it to be raised from, and lowered into, position, substantially as described.

56,995.—Dough Kneader.—Ansell P. Routt, Orange Court House, Va.

I claim the combination of the two rollers, provided respectively with the round-headed projections and the straight-sided pins, as and for the purpose described.

In combination with the above, I claim the cutters, L L, substantially as and for the purpose described.

56,996.—Wrench.—A. Newton and Frank Favro, Worcester, Mass.

In combination with the upper movable or hammer jaw and the stationary lower jaw and handle of a wrench, constructed substantially as described, we claim the tip nut in the end of said wrench, when arranged and operating as herein shown and for the purposes set forth.

56,997.—Smoking Pipe.—Rufus Norwood, Baltimore, Md.

I claim, First, A cap, B, constructed and applied to the stem and bowl of a pipe, in such a manner that the stem is connected by it to the bowl, and at will may be disconnected or adjusted, substantially as and for the purpose described.

Second, The combination of a cap, a, cap, B, and a sliding stem, C, having a plunger applied to it, substantially as described.

Third, The combination of a hollow plunger stem, C', with a pipe, having a detachable cap, B, substantially as described.

56,998.—Knife.—William Sausser, Hannibal, Mo.

I claim, First, A knife blade provided with a slot, substantially as and for the purpose described.

Second, The spring holder, for the purpose described.

Third, The back spring, B, constructed and operating substantially as described.

56,999.—Lamp Chimney.—Ejlert O. Schartan, Philadelphia, Pa.

I claim the construction and combination of the glass chimney, jointed and constructed as herein described and for the purposes set forth.

57,000.—Fare Box.—J. B. Slawson, New Orleans, La.

I claim, First, The inclined planes, b c d, arranged in zig-zag form, and provided with knife edges, g, in combination with the box, A, constructed and operating substantially as and for the purpose described.

Second, The recess, h, at the lower end of the inclined planes, c d, substantially as and for the purpose set forth.

57,001.—Smut Machine.—A. and G. Smith, Flint, Ind. Antedated August 2, 1866.

First, I claim the spouts, C and p, having the perforations or springs, a, and revolving disk, i, arranged as shown, in combination with the fan, G, for the purpose of extracting the dust and other light refuse from the grain, previous to the latter's entering the smutter, as set forth.

Second, The shaft, g, having the disk, k, attached thereto, and located so as to receive the grain as it falls from the smutter, D, in combination with the duct or passage, l, and fan, G, all arranged and operating in the manner and for the purpose herein set forth.

57,002.—Coal Screen.—J. B. Smith, Dunmore, Pa.

I claim combining with a series of graduated, meshed screws, a series of smooth conveyers, so that as soon as the coal is separated, it shall be carried out of the machine without any further unnecessary action, which only produces waste, substantially as herein described.

57,003.—Bed Bottom.—J. G. Smith, Battle Creek, Mich.

I claim the loops or clasps with the elliptic or spiral spring, in combination with the bed bottom, substantially as and for the purpose set forth.

57,004.—Eraser.—Ruel Smith, Bangor, Me.

I claim as my invention the new article of manufacture of a bookkeeper's eraser and burnisher, made and operating as hereinbefore set forth.

57,005.—Harvester.—Willis W. Lowles, Manlius, N. Y.

I claim the arrangement of devices for operating the cradle or receptacle, R, so as to discharge the grain delivered thereto from the cutters of the machine, the same consisting in hanging their sides, a (on one of which is weighted), so as to swing, said sides being connected to a common beam or lever, c, by rods, d2 d4, upon which beam rests a horizontal lever bar, h, having a pendent arm, o, with its stud, q, in combination with the snail, t, and friction pulley, o, of the apron shaft, J, or its equivalent, of the machine, the whole being arranged together, and operating substantially in the manner described.

57,006.—Gas Main.—J. N. Stanley, Brooklyn, N. Y.

I claim as an improvement in hydraulic mains for gas works, the combination with the elliptical or cylindrical main pipe, C, of the external supply tubes, D D D, cast in one piece, with the pipe, c, and communicating with the lower part of the latter, as herein specified, and for the purposes set forth.

57,007.—Cultivator Plow.—William W. Stillman, Mt. Hawley, Ill.

I claim the shank, B, the collar, C, and the clamp, E, arranged and used substantially in the manner and for the purpose set forth.

57,008.—Device for Gathering Fruit.—Warren H. Stone, St. John's, Mich.

I claim the combination of the flexible tube, E, apron, D, with the frame, A, or its equivalent, all for the purposes and substantially as herein described.

57,009.—Process for Ripening Liquor.—William Mont Storm, New York City.

I claim subjecting liquors to violent agitation in a closed vessel while subjected to a pressure of oxygen gas, the liquor at the same time being made to constitute part of a galvanic circuit, substantially in the manner and for the reasons set forth.

57,010.—Presser-foot of Sewing Machine.—A. J. Tewksbury, Haverhill, Mass.

I claim the devices hereinbefore described, consisting of arm, A, screw, S, and spring, P, and affixing the same to the ordinary solid pressure pad, for the purpose of changing it into a flexible pressure pad, and applying the whole in connection with the feed wheel of a sewing machine, as and for the purpose set forth.

In combination with the above, I claim the holes, 1 2 3, whereby the degree of pressure of the spring, P, upon arm, A, may be adjusted for different thicknesses of material.

57,011.—Drilling Machine.—R. A. Thomas, Damascus, Cal.

I claim, First, The combination in a machine for drilling rock in drifts and tunnels of the stanchion post, B, the bar, C, that supports the feed screw and drill, and the adjustable box, H, constructed and arranged substantially as described.

Second, I also claim the square box, L, fitted to the stocks of the drill and feed screw, substantially as described, so that they can be connected at pleasure.

57,012.—Life-Boat.—George H. Tier, Fremont, Ohio.

I claim, First, The air chambers, E E, with the compartments, a a s, as constructed and arranged with the sides, B B, for the purpose and in the manner set forth.

Second, The curving deck, F, the bottom, C, as arranged in combination with the curving sides, B B, the sides, D D, chambers, E, in the manner and for the purpose substantially as described.

57,013.—Stretcher.—Charles H. Tompkins, U. S. Army.

First, I claim the frame, A, of a hand carriage stretcher, constructed with a transverse joint which is provided with bolts, a a, for stiffening it, and is also constructed with hinged legs, B B, and with jointed leg rests, J J, which are adjustable, and with a head rest, D, which is also adjustable, all substantially as herein described and for the purposes set forth.

Second, The open hand carriage stretcher frame, A, in combination with the adjustable divided leg rests, J J, and sliding bottom, G, substantially as and for the purpose set forth.

Third, Attaching the canvas bottom, G, at one end of the hinged frame, D, and at the other end to a sliding bar, H, having locking braces, d d, or their equivalents, applied to it, substantially as described.

Fourth, The combination of the jointed supports, D, adjustable head rest, D, and the jointed stretcher frame, A, substantially in the manner and for the purposes described.

Fifth, The application of a flexible arm rest, K, to the stretcher, substantially as described.

Sixth, The hand carriage stretcher frame, A, constructed with a transverse joint near its middle, with an adjustable bottom, G, and with adjustable and sectional rests, J J, for the legs of a person, substantially in the manner and for the purpose described.

Seventh, Connecting the stretcher to transporting wheels by means of the sliding fastening, or its equivalent, which is so constructed that the wheels can be attached or detached at pleasure, as set forth.

Eighth, Constructing the axletree of the carriage wheels of the stretcher of folding sections jointed together, and provided with means for stiffening the joints, substantially as described.

Ninth, Attaching the carriage wheels to the loose screw collars, p p, upon the axletree, so that these wheels can be removed or applied at pleasure without the use of detachable nuts or other similar devices, substantially as described.

57,014.—Car Coupling.—Henry H. Trenor, New York City.

I claim the combination with the trucks, of a coupling bar extending throughout the whole length of the car, so that the cars shall be at pleasure from the strain due to the traction of the whole train, substantially as herein shown and set forth.

57,015.—Car Brake.—Henry H. Trenor, New York City.

I claim the arrangement and alternating connection of the brakes, as herein described, by means of rods actuated by cranks mounted on horizontal or vertical axes, and vibrated through the intermediary of chain and windlass, or the mechanical equivalent thereof, by hand, steam, or other power.

57,016.—Composition for Lining Barrels.—H. W. C. Tweddle, Pittsburgh, Pa.

What I claim is the use of common glue or gelatin mixed with a small quantity of bichloride of mercury, as a coating for the interior of barrels for holding petroleum, turpentine, and other articles.

57,017.—Lamp and Candle Stand and Holder.—Gabriel Utley, Chapel Hill, N. C.

I claim the lamp or candle stand constructed substantially as described, with a base, and spring arms with socketed termination.

57,018.—Machine for Tenoning Spokes.—Oliver Vanorman, Ripon, Wis.

First, I claim the combination of the knives, G and I, the levers, C, the spring, F, the adjustable gage, K, the adjustable face plate, H, the crank, L, and adjustable presser, M, with each other, and with the bed piece, A, substantially as herein described and for the purpose set forth.

Second, The combination of the knives, G and I, the lever, C, the spring, F, the adjustable gage, K, the adjustable face plate, H, and the adjustable side-presser or holder, P, substantially as described and for the purpose set forth.

57,019.—Hat.—W. F. Warburton, Philadelphia, Pa.

First, I claim a sweat band secured in the interior of a hat or cap, at intervals, and arranged to be yielding or elastic at a number of points, in the manner and for the purpose described.

Second, The above in combination with the band or ring, C.

57,020.—Gas Apparatus.—William Warner and E. S. Redstreake, Philadelphia, Pa.

First, We claim the combination of spiral or other springs with the disks, D D and D D, arranged and operating substantially in the manner and for the purpose above set forth.

Second, The combination of the induction pipes, B a, exit pipe, C, and disks, D, with the vessel, A, the whole being constructed and arranged in relation to each other for joint operation, substantially as described and for the purposes specified.

57,021.—Rolling Apparatus.—Hervey Waters, Boston, Mass.

I claim the combination, with a suit of roller dies, of a lateral or cross carriage for holding the work and guiding it to the successive dies.

Also, the arrangement or system of mechanism for moving the carriage laterally, and retaining it in proper position for the action of each pair of dies upon the blank.

Also, the system of die grooves equiangular and rhomboidal in respective plain cross section, substantially as described.

Also, in combination, the rolls, b b, having a suit of die grooves, with the index, m, the bolder, g, the index, i, and the stops, l, for determining the position of the blank with relation to the dies, to which it is presented.

57,022.—Ventilated Vault for Wine, Potatoes, etc.—James Weed, Muscatine, Iowa.

I claim the construction of preserving chambers, having waterproof walls, beneath the surface of the ground, said chambers having communication with each other, and means of access to them, and surmounted by a covering of some non-conductor of heat, substantially as herein described.

57,023.—Harvester Cutter.—John M. Wehrly, Somerville, N. J.

I claim the mortised clamping plate, E, in combination with the notched or hook-shank knives, C C, and slotted knife frame, A, substantially as and for the purpose herein specified.

57,024.—Fruit Basket.—Corydon Wheat and Charles Bunge, Geneva, N. Y.

We claim the band, C', and clasps, D and D, when made and used for the purpose herein set forth, in combination with the body of the basket when composed of one piece of stuff.

57,025.—Pitcher.—Nathaniel J. Whiting, Lawrence, Mass. Antedated Aug. 3, 1866.

I claim the dripping tube formed in two pieces, one fixed and the other so attached that it can be taken off when the pitcher is to be washed, in combination with the external dripping cup or lip.

57,026.—Hot-air Furnace.—Harry Whittingham, New York City.

First, I claim the arrangement of the combustion chamber, B, with a firepot and with a series of vertical and horizontal air flues in combination with the air chamber, C, smoke chamber, D, and hot-air chamber, E, all constructed and operated substantially as and for the purposes described.

Second, The openings, e, in the bottom of the air chamber, C, in combination with the horizontal flues, c, and vertical tubes, b, in the combustion chamber, B, constructed and operated substantially as and for the purposes described.

Third, The air tube, K, passing from the chamber, C, through the smoke chamber, D, into the hot-air chamber, E, constructed and operated substantially as and for the purpose set forth.

57,027.—Hot-air Furnace.—Harry Whittingham, New York City.

I claim, First, The cone, F, in combination with the firepot, A, drum, E, and air pipes, H, constructed and operating substantially as and for the purpose set forth.

Second, In combination with the above I claim extending the air pipes, H, through the bottom of the heating drum, substantially as and for the purpose described.

Third, The annular evaporator, I, in combination with the jacket, D, and heating drum, E, constructed and operating substantially as and for the purpose set forth.

57,028.—Hot-air Furnace.—Harry Whittingham, New York City.

I claim, First, The central air chamber, C, with pipes, a b, in combination with the firepot, A, and annular air chamber, E, constructed and operating substantially as and for the purpose set forth.

Second, The arrangement of a series of annular smoke chambers, D F H, with a series of air chambers, C E G, firepot, A, and escape pipe, b', all constructed and operating substantially as and for the purpose set forth.

Third, The annular head or chamber, h, in combination with the escape pipe, b', and with the smoke chamber, H, constructed and operating substantially as and for the purpose described.

57,029.—Horse Shoe.—Albert S. Wilkinson, Pawtucket, R. I.

I claim, First, The combination of the double shoes, A a, toe clip, B, with its loop, c, curved heel clips, b b, with buttons, g g, clamping bands, f f, clamping screw, h, all constructed as described and operating in the manner and for the purpose herein represented and described.

Second, I claim the jam nut, i (Fig. 2), in combination with the clamping or retaining band, f, and clamping screw or bolt, h, substantially in the manner and for the purpose described.

Third, I claim the rubber padding, e e, in combination with the heel clips, b b, and toe clip, B, substantially in the manner and for the purpose described.

57,030.—Horse Shoe.—Albert S. Wilkinson, Pawtucket, R. I.

I claim a round bottom or rolling shoe, A, having a toe calk, a', or having toe and heel calks, a' a a, substantially in the manner and for the purpose set forth.

57,031.—Bed Bottom.—J. E. Wilsey and D. Forbes, Chicago, Ill.

I claim the combination and arrangement of the slats, B and A, the latter being provided at their ends with the rabbeted cross bar, D, for the reception of the slats, F, with the spiral springs, G and H, interposed, as shown and described.

57,032.—Telegraph Sounder.—Elisha Wilson, New Haven, Conn.

I claim, First, The employment of the open valve stop, v, or any equivalent therefor, to control the sounding at the end, at the mouth, or at the side of air, gas, or vapor-sounding instruments for telegraphic communication.

Second, Modifying the mouth and throat and generally reducing the dimensions of air, gas, or vapor-sounding instruments in order thereby to diminish the amount and force of the current until it ceases to essentially interfere with the free action of the armature lever, l, and valve, directly or indirectly opposed to it, and also to economize the sounding medium used, and to improve the tone for rapid utterance for telegraphic communication.

Third, The combination of the valve, n n, and cord, d d, to both raise and fill the reservoir in one act, for the same purpose.

Fourth, The combined use of two or more reservoirs in connection or with each instrument of a small expansive reservoir or gas bag, that the supply may be continuous while the reservoir is being raised and filled to supply air for telegraphic sounders.

57,033.—Propelling Apparatus for Vessels.—Daniel Winer, Lockport, N. Y.

I claim the inflated cylinder, A, provided with helical blades the whole length in combination with the inclosing trunk, B, with open ends, arranged and operating substantially as set forth.

In combination with the above-described device, I claim uniting two or more, B B, together and inclosing the angular spaces, g g', above their points of junction, and a horizontal line touching their peripheries to form a series of air chambers, substantially as shown and described.

57,034.—Type-setting Machine.—Charles Baer (assignor to himself and J. William Krietz), New York City.

First, I claim the revolving type-receiving channel, G, in combination with a series of radiating type cases, c, constructed and operating substantially as and for the purpose set forth.

Second, The lip, c, at the mouth of the type cases, c, in combination with the prongs, g', on the revolving type channel, G, constructed and operating substantially as and for the purpose described.

Third, The cams, g*, on the forked mouth of the revolving type channel, G, in combination with the type cases and the line of type contained therein, substantially as and for the purpose set forth.

Fourth, The cams, r, between the mouths of the type cases, c, to act in combination with the line of type in the revolving type channel, G, substantially as and for the purposes set forth.

Fifth, The spring hooks, h, and pushers, e, in combination with the keys, F, and type cases, c, and lips, e, constructed and operating substantially as and for the purpose described.

Sixth, The spring hooks, s, and spring bearer, u, in combination with the revolving type channel, G, constructed and operating substantially as and for the purpose set forth.

Seventh, The adjustable galley, K, with the sliding-rake, M, in combination with the revolving type channel, G, constructed and operating substantially as and for the purpose described.

57,035.—Steam-Jet Pump.—Charles Barnes (assignor to Warden, Rensford & Co.), Cincinnati, Ohio.

I claim a steam-jet pump constructed substantially as described, with jet perforations, d, and a direct water passage, A B C, as set forth, and for the purpose specified.

57,036.—Caster.—Thomas Beach, Freeport, Pa., assignor to self and Stanley R. Moorhead.

I claim the cap, d, secured to the socket barrel by the shoulders, n n, or other equivalent device, and the annular cup, b, the two being constructed, arranged, and combined substantially in the manner and for the purposes above set forth.

Second, A furniture caster having a socket, a, an annular cup, b, a cap, d, and springs, m m, arranged and combined substantially in the manner and for the purposes above set forth.

57,037.—Packing Rings for Pistons of Steam Engines.—John F. Bogardus (assignor to himself and Jos. Anderson, and Thos. K. Schermerhorn), Brooklyn, N. Y.

I claim the arrangement of the packing rings, d d and e, with the edges that come in contact, inclined, and the ring, e, narrowed at the back than on the face, and not so thick as the rings, d d, so that the ring, b, and springs, c c, shall only act to expand the ring, e, by the contact of the rings, d, with its inclined edges, for the purposes set forth.

57,038.—Excavator.—Jeremy Bradley, Cedar Falls, Iowa, assignor to himself, Walter Pastley, and S. B. Hewitt, Jr.

I claim, First, Combining with the scoop of a ditching or excavating or grading machine, a reciprocating shovel which is so arranged that it will automatically keep the forward part of the scoop clear of earth, substantially as described.

Second, The combination of the scoop, D', and elevator, a', with a shovel, B, operating substantially as described.

Third, The arrangement of the plows, E E, in front of the scoop, D', in combination with a shovel, B, and a contrivance for elevating earth, substantially as described.

Fourth, Sustaining the forward part of the machine upon transporting wheels, J, by means of the beams, F F', chain, g, and windlass, h, the latter being supported upon a post, K, which passes through a slot in said beam, F', substantially as described.

Fifth, Connecting the transverse beam, F, to the bolster, G, by means of a jointed rod, G' substantially as described.

Sixth, Transmitting motion to the endless discharging apron from the upper roller, s, of the elevator apron, a', by means of a shaft, C2, a gimbal joint b2, and spur wheels, c c', substantially as described.

57,039.—Bed Bottom.—Albert D. Chase, Reading, Pa., assignor to himself and Amos T. Hubbard, Philadelphia, Pa.

I claim the hereinbefore described mode of suspending the slats of beds, by means of the double hooks, B, rod, C, loop, D, cross piece, E, and plate, F, the said several parts being respectively constructed and combined for use, substantially as set forth.

57,040.—Safe Lock.—William B. Dodds (assignor to himself and Neil Macneale), Cincinnati, Ohio.

I claim the L-shaped bolt pivoted in brackets secured to the frame of the door, and moving on a vertical axis under the impulse of the lock and connecting bar, substantially as described.

57,041.—Brick Mold.—James M. Ferrell, Philadelphia, Pa., assignor to himself, Wm. H. Siner and Charles H. Dedrick.

I claim, First, The combination of the rods, C D, gears, F F' cams, E, ways 1 1', handles, G, bottoms, L, and frame, A, in the manner and for the purpose substantially as shown and described.

Second, I claim the V-shaped stops, h h', arranged and operating in the manner and for the purpose substantially as shown and described.

57,042.—Machine for Making Nuts and Washers.—Charles P. Geissenhainer (assignor to himself and Joseph Graff), Pittsburgh, Pa.

I claim the combination of the stationary dies, d and f, with the hollow die or sleeve, g, and punch h, which move together, arranged and operating for the manufacture of nuts, substantially in the manner hereinbefore described.

57,043.—Machine for Bending Chain Links.—Edward L. Keeler (assignor to himself and Joseph Graff), Allegheny, Pa.

I claim the combination of the mandrel or mandrels, a, projecting from the periphery of a revolving disk, C, the converging dies, D D', and knife set so as to bevel the ends of the link, constructed and operating substantially as and for the purposes hereinbefore described.

The converging dies, D D', having grooves, o, slightly inclined in different directions in combination with the mandrel or mandrels for the purpose of bending over the ends of the link, without closing the link, substantially as and for the purposes hereinbefore set forth.

57,044.—Saw Set.—John Lyle (assignor to himself and Cotton H. Allen), Newark, N. J.

I claim a saw set constructed and arranged substantially as herein described and for the purpose set forth.

57,045.—Riveting Machine.—Ransom Lyon, West Troy, N. Y., assignor to himself, A. Shiland, and E. Joseph Gerdorn, Jr.

First, I claim the combination and arrangement as described of stationary frame and sliding frame with hammer, E, which is elevated by the arms, S S, on the driving shaft and forced down by the spiral spring, J, and rotated as described by ratchet wheel, K, in connection with the levers, M, and N, which are acted upon by the crank on the driving shaft; these parts or their equivalents arranged and operating as and for the purpose set forth.

Second, I claim the arrangement of the adjustable bed-plate, T, jaws, P P, opened by spiral spring inserted between, and closed by the action of the arm, W, in connection with the sliding frame, the whole arranged and operating as set forth.

Third, I claim the combination of the adjuster, R, spiral spring, J, rubber packing, F, with hammer, E, substantially as described.

57,046.—Sawing Machine.—Salmon W. Putnam, Fitchburg, Mass., assignor to the Putnam Machine Co.

I claim so constructing and operating the frame, I, which carries one or more saws, that it can be revolved entirely around and bring each saw to its desired position in respect to the table, when arranged substantially as described and for the purposes set forth.

57,047.—Sewing Machine.—T. K. Reed, East Bridgewater, Mass., assignor to Elmer Townsend, Boston, Mass.

I claim the method of preventing the hook from catching into the bow of the loop through which the needle is passing, by swinging the loop around on the needle, substantially as described.

Also, combining with the hook needle and other mechanism, the reciprocating rod and its finger, the rod receiving its motion and the finger acting on the thread, substantially as set forth.

57,048.—Neck-tie Supporter.—Theodore Rosenthal (assignor to Julius Solinson, Julius Meyer, and Jacob Schawb), New York City.

I claim the plate or spring, A, provided with projecting spring jaws, b, which form a clasp to embrace the shirt button, substantially as and for the purpose specified.

57,049.—Cattle Hitch.—Charles H. Sawyer (assignor to himself and T. J. Little and Samuel C. Rundlett), Hollis, Me.

I claim the combination of the block, B, clapper, C, bow, A, and cord, H, when arranged in the hitch as set forth, all constructed and operating as herein specified.

57,050.—Ditching Machine.—Judd Stevens, Chicago, Ill., assignor to the Chicago Spading and Ditching Machine Company.

First, I claim so attaching and arranging a series of shovels in the periphery of a wheel, M, that said wheel may have a forward slip upon the shovels, substantially as and for the purposes described.

Second, In combination with the shovels and wheel aforesaid, I claim the arrangement of the stationary curved bearing, O, operating substantially as and for the purposes specified.

Third, In combination with the series of shovels and wheel, M, I claim the arrangement of the pivoted arms, m, and cam-bearing T, for the purpose of locking said shovels to the wheel, as and for the purposes set forth.

Fourth, I claim the arrangement of the cam, Q, with the wheel and shovels aforesaid, for the purposes and in the manner described.

Fifth, I claim, in combination with the wheel, M, and shovels, N, the arrangemnt of the cam, W, operating substantially as and for the purposes specified.

Sixth, I claim the arrangement of the cam, Y, with the shovels, N, for the purposes set forth.

Seventh, I claim attaching the shovels to the wheel by means of the jointed arm, a b, substantially as and for the purposes described.

57,051.—Churn.—Alexander C. Wade (assignor to himself and George Thilman), Paris, Ill.

I claim the double-winged beater, I J K, journaled to the lid, D, as described, in combination with the removable frame, L, and its accessories, N N' O O' O", all arranged and operating as explained and set forth.

57,052.—Washing Machine.—Alexander C. Wade (assignor to himself and George Thilman), Paris, Ill.

I claim, First, The provision, in a washing machine, of the double batler, H, consisting of the two series of rods, I and J, and pivoted to permit a swinging motion, substantially as described and set forth.

Second, I claim the double batler, H I J, when journaled to the lid, C, in combination with the removable roller frame, L, the whole being arranged and operating in the manner herein explained and set forth.

57,053.—Curtain Fixture.—George M. White (assignor to himself and F. B. Carpenter), New Haven, Conn.

I claim the combination of the two cords, f f, with one or more rolls provided with pulleys corresponding to the said cords, f, and arranged with a compensating spring, and so as to be operated substantially in the manner and for the purpose set forth.

57,054.—Turning Lathe.—S. C. Wybell (assignor to himself and F. N. Bixby), West Meriden, Conn.

I claim the attachment, constructed, arranged and operated substantially as and for the purposes set forth.

57,055.—Sad-Iron Heater.—Patrick Flinn, deceased (by Abel T. Atherton, Administrator), Lowell, Mass.

First, I claim the angular pillars, j j j, in solid connection with the top plate, f, of the fire-box to the bottom plate, g, as herein described.

Second, I claim the top plate, f, of the fire-box, so constructed as to throw the flame of gas as herein described.

Third, I claim the flues, O and P P, located at the back end of the fire-box, for the purpose described and manner set forth.

Fourth, I claim the flattened, perforated gas-pipe, l, and spiral springs, n n, for the purpose herein described.

57,056.—Constructing Blocks or Plates for Printing Maps.—George Washington Bacon, London, England.

I claim the combination of the block or sheet, A, having an engraved surface, with the electrotype letters mounted upon a block, B, in the manner substantially as described.

57,057.—Injector for Boilers.—James Gresham, Manchester, England.

I claim the arrangement of mechanical devices, as herein set forth, whereby a supplemental steam jet may be produced for raising water, in combination with the ordinary steam jet of the Giffard injector for forcing water, in the manner and for the purpose as herein set forth.

57,058.—Boring Apparatus.—Samuel Cary, Centerville, La.

I claim the combination and application of the center point spring valve, with the double spur lip, cutter blades, semicircular scoop, and tubular shank, for coupling to, for any desired depth, substantially as herein described, for the purposes specified.

57,059.—Uniting Iron and Steel for the Manufacture of Railroad Rails.—William Batty, Troy, N. Y.

I claim the employment, as a flux, of the compound or mixture herein mentioned and described, substantially in the manner and for the purposes herein set forth.

57,060.—Water Reservoir for Cooking Stoves.—Esek Bussey, Troy, N. Y.

I claim the reservoir boiler, or tank, A, constructed entirely of cast iron or other cast metal, and covered or coated upon the inner surfaces thereof, with or by an enamel, b, when applied to and combined with cooking stoves, in the manner substantially as and for the purposes herein described and set forth.

REISSUES.

2,326.—Composition for Kindling Fire.—Elizabeth Bellinger, Mohawk, N. Y. Patented Dec. 13, 1859.

I claim a self-lighting fire kindler, made substantially as herein described.

2,327.—(Div. A.)—Cut-Off Gear for Steam Engines.—Albert D. Crombie and Lucy Colborn, Baltimore, Md., and John M. D. Greene, Funksville, Pa. (assignees by mesne assignments of Wells L. Colborn). Patented March 1, 1864.

We claim the combination of the sliding block, I, the fulcrum, g, and the rock lever, G, or their equivalents.

2,328.—(Div. B.)—Cut-Off Valve Gear for Steam Engines.—Albert D. Crombie and Lucy Colborn, Baltimore, Md., and John M. D. Greene, Funksville, Pa. (assignees by mesne assignments of Wells L. Colburn). Patented March 1, 1864.

We claim the sliding block, I, the fulcrum, g, and the rock lever, G, or their equivalent devices, in combination with a steam valve and governor.

2,329.—Sausage Stuffer.—Purches Miles, New York City (assignee of John J. Weeks). Patented Sept. 19, 1854.

I claim, First, The revolving cylinder and conveyor or conveyors, eccentric to the case or cylinder, in combination with a hopper for containing the meat, and with a tube through which the sausage meat is delivered and stuffed into a gut or intestine, substantially as set forth.

Second, The shaping and protecting tube, K, in combination with the delivery tube, I, substantially as and for the purposes specified.

2,330.—Melodeon.—George A. Prince, Charles E. Bacon, and Calvin F. S. Thomas, Buffalo, N. Y. (assignees of Josiah A. Rollins). Patented June 3, 1856.

We claim, First, Placing and arranging within a melodeon, or other like reed musical instrument, two or more sets of valves, in connection with two, three, or more sets, or parts of sets, of reeds, so that one set of valves will act upon and open another set of valves, by the action of one set of keys, and one set of push-down pins, substantially as described.

Second, Supporting the front set of valves by a strip of wood, k, or other equivalent, for the purpose and substantially as described.

2,331.—Pegging Jack.—D. Whittemore, North Bridgewater, Mass. (assignee of William R. Landfear). Patented Nov. 28, 1865.

I claim a pegging jack as made with its last supporter sustained by and so as to be capable of being moved or turned laterally on either of two separate centers, d e, substantially as and for the purpose described.

I also claim a pegging jack as made with its last supporter sustained by and so as to be capable of being moved or turned laterally on either of two separate centers, d e, and also of being tipped or turned longitudinally on a third center, a, the whole being substantially as described.

I also claim the last supporter, A, as made with the two arms, b b, substantially as represented.

I also claim the arrangement of the pins or screws, d e f, and the slots, g h i, with the plates, B C, arranged and combined with the last supporter, A, substantially as specified.

DESIGNS.

2,375.—Metallic Armor for Boots and Shoes.—Amos Hamlin, Schoharie, N. Y.

2,376.—Work Basket Stand.—Henry Hunermund, New York City.

2,377.—Clock Case.—Nicholas Miller, New York City.

2,378.—Trade Mark.—Silas S. Putnam, Dorchester, Mass. (assignor to S. S. Putnam & Co).

2,379.—Plates of a Stove.—G. Smith and H. Brown (assignors to Abbott & Noble), Philadelphia, Pa.

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A GOOD NUMBER.—The Phrenological Journal for August contains Portraits of Ben. Franklin, Lewis Cass, C. F. Brydges, Brunell, Mrs. Parkhurst, etc., with articles on Responsibility; Sowing and Reaping; The Servant Question; Getting Married; Writing, the Philosophy of Phonography; How to Live; Air and Sunlight; Summer, and its Lessons; Over-Eating; Head and Body; Man-Monkeys; Insanity, and Religious Excitements; Physiognomy, Time, Tune, Veneration, Double Chins, Large Ears, etc. 20 cents, or $2 a-year. FOWLER & WELLS, N. Y. 7 2

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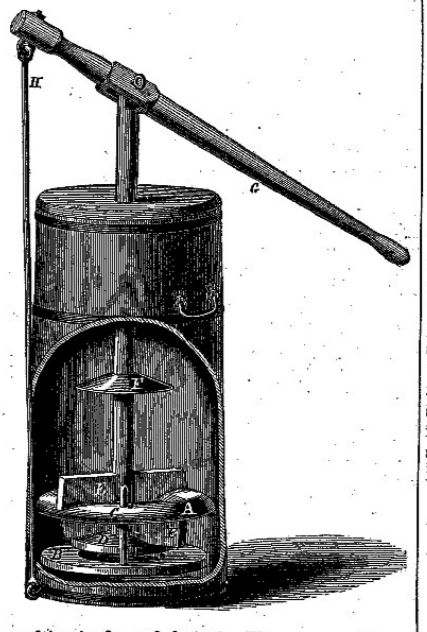
The object, in producing butter, is to agitate the cream rapidly so as to break the vesicles in which it is contained, and it is obvious that a great variety of mechanical contrivances and motions can be introduced for the purpose. It is claimed that many of the churns in common use injure the grain of the butter, and thereby reduce its market value; but the inventor says that the one here shown is capable of reducing the cream in a much shorter space of time than common churns, and that a superior quality of butter is made by it. The chief novelty is in the dasher, which is constructed in two parts, A and B; the lower disk, B, has a hole through it, and is suspended from the upper one by rods, C; these rods allow the disk to rise and fall vertically. As the dasher is forced down through the cream, the latter passes up around the edges of the dasher to the top of it.

On raising the dasher again the bottom disk drops, thus affording an opening through the valve, D, by which the cream falls to the bottom again, thus continually passing and repassing through openings, and against the surfaces of the several parts,



resulting in the end desired. There are partitions, E, in the top of the valve, and also in the upper disk, so that the process is expedited, and there is a loose disk, F, which plays up and down on the dasher rod, and equalizes the flow and pressure through the various parts.

The dasher is worked by the handle, G, which is attached to a rod, H, so that it can vibrate freely and allow the dasher to rise without binding.

This invention was patented by Thomas R. Bailey, through the Scientific American Patent Agency, April 4, 1866. For further information address him at Lockport, N. Y.

Mutual Dependence.

Farmers are popularly supposed to be "independent," that is, above the necessity of calling on their neighbors or individuals who follow other callings, for the necessaries of life, but reflection will show that all classes of society, in a state of civilization, are mutually dependent. The farmer raises his bread and his clothing, but if no one buys his surplus, he must live in a hut devoid of all that makes life agreeable.

A "Digger" Indian is an example of "independence," and an example of the most abject degradation the human species can sink to. His clothing is nothing at all in summer, and, in winter, what he can find. His meat is carrion and insects, and his home a burrow in the ground. Who wouldn't be independent?

A COTTON factory costing $75,000 is to be erected at Auburn, Alabama.

ELLIOTT'S SASH SUPPORT.

This sash supporter is also a lock or guard against undesirable intruders, such as midnight marauders and others of the baser sort. It is readily attached

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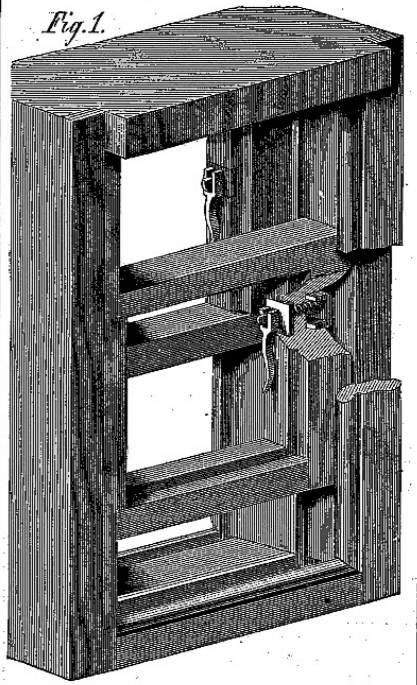
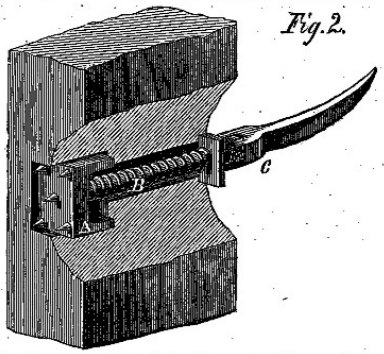


to any window sash, and not only serves the purposes alluded to, but also prevents rattling and shaking of the window in its casement.

In detail, it is a casting, A, provided with a rod, B, roughened at the end, which works against the side of the frame, as shown by points in the engraving. A handle, C, is fastened to the end of the rod, and so formed that it can be turned down, as in Fig.

Fig. 2.



1, or thrown out horizontally, as in Fig. 2. When horizontal, the corrugated or spiked foot is withdrawn from contact with the casement, and the sash can be raised; when vertical the foot is thrown in and the sash is held suspended at any point. These fittings can be applied to any sash, old or new.

The invention was patented by J. W. Elliott, June 12, 1866, to whom all communications should be addressed, box 556, Toronto, C. W.

The Silk Spider of South Carolina.

Dr. Wilder, in a lecture recently delivered in Boston, claims that the silk species of spider was discovered by him in August, 1863, and from its body he wound one hundred and fifty yards of silk in one hour and a quarter. In 1864, an officer in the army wound three thousand four hundred and eighty-four yards from thirty spiders, a single thread being sufficiently strong to sustain a weight of 44 to 107 grains. In 1865, Dr. Wilder, after many disappointments, succeeded in getting a number of the spiders, though from ignorance of their habits, etc., they all died; but from their eggs several hundreds were afterward raised. The silk is either golden-yellow or silver-white, and of great brilliancy; the former is elastic, and the latter non-elastic, and is used for the main stays of the web. Dr. Wilder has at present several young broods living in his room at Boston, and also at the Cambridge Conservatory.

Explosion of Bombshells.

A few days since a bombshell exploded in some hydraulic works at Brooklyn, breaking the arm and otherwise severely injuring the limbs of the workman who was engaged in breaking it up. Explosions and accidents of this nature are becoming far too common, nor is it over-stating the case when it is said that scarcely a fortnight has elapsed since the war in which similar catastrophes have not occurred. The shell in question was brought from Richmond, along with a lot of old iron, and it was evidently supposed that the length of time which had elapsed since its manufacture, and the rusty condition in which it was found, precluded the possibility of its explosion. This, however, by no means follows.

Some twenty years ago a relic of the old French war was picked up at Lake George, which spoke loudly for itself and told emphatically what it was made for. This was a bombshell, which was found in the lake, near the shore, under Fort William Henry, and which was in all probability discharged at the fort at the time that the Marquis de Montcalm besieged it in 1758. This shell must, therefore, have lain at the bottom of the lake about eighty years. Those who found it undertook the fool-hardy experiment of testing its efficiency, and applied a fuse to it. To their astonishment it exploded, and a piece of it passed through the side of the Lake House (which is of wood) and lodged in an attic chamber.

Mr. Sherrill, the proprietor of the house at that time, deposited this piece of the shell, together with an account of the transaction, in the cabinet of the Brooklyn Lyceum, where both may be seen. The composition of this shell was found to be different from those now in use—the iron being mixed with some brittle and earthy material. That which makes this case the more remarkable is the fact of the length of time which it had lain under water. —*Journal of Commerce.*

THE survey of the proposed Chattanooga and Cincinnati Railroad was begun on the 6th of August, at which time the work of locating the line was also begun. About a million of dollars have been subscribed in Cincinnati for the road.

MECHANICS

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